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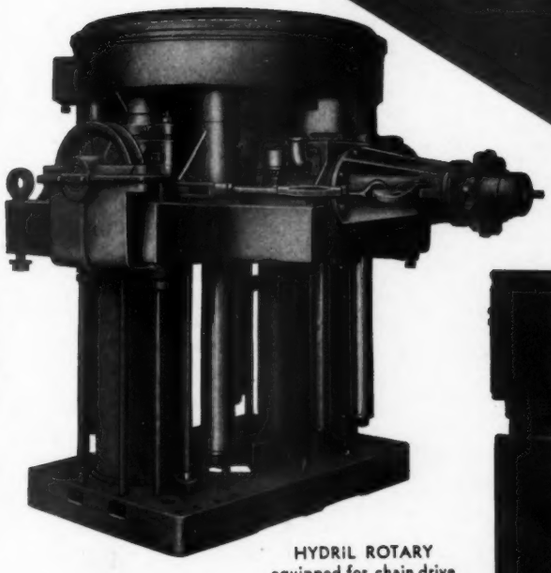

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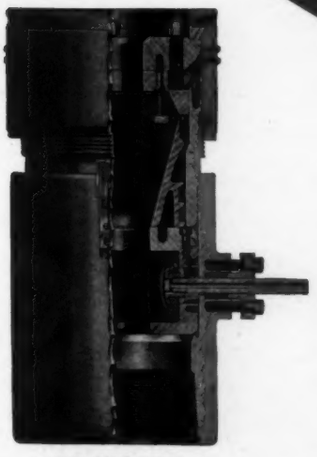

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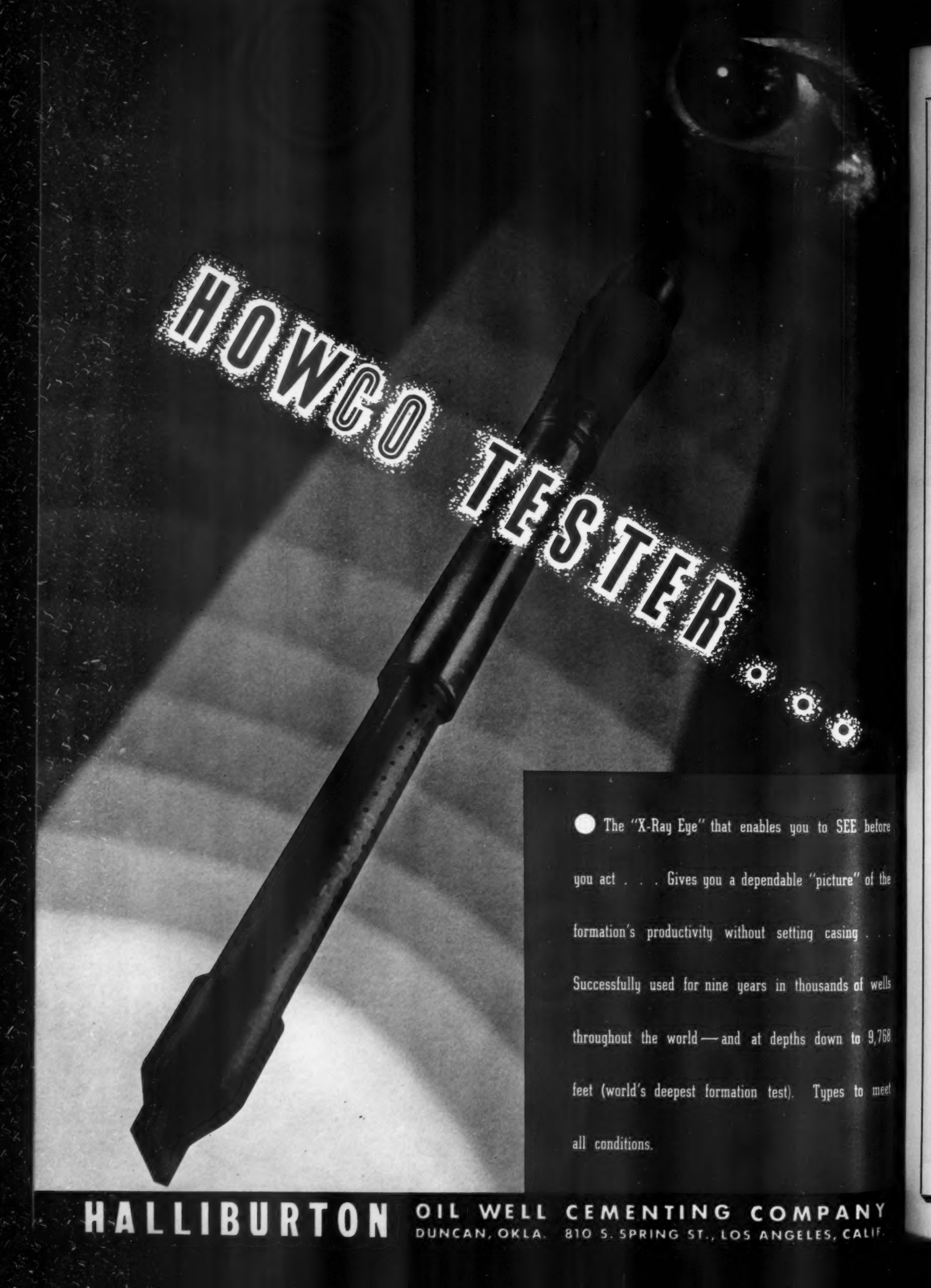

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Notable Discoveries Made In Two States

By JAMES McINTYRE

DISCOVERIES of importance were made in the past week by Mid-Continent producers. A McLish sand pool was opened by the Continental Oil Co. in the Jesse area, a few miles southeast of the Fitts pool, in Pontotoc County, Oklahoma, but on a separate structure, and the first Trinity sand test in Texas to produce gas or oil commercially, was brought in by the Tide Water Oil Company and Texas Seaboard Oil Company in the heart of the Cayuga field in Anderson County. The latter well is a big gasser, also producing distillate. It may develop into an oil well, but if not, the owners have a ready market for the gas production. The discovery will doubtless lead to a revival of the search for Trinity sand pay which has been pursued intermittently for years.

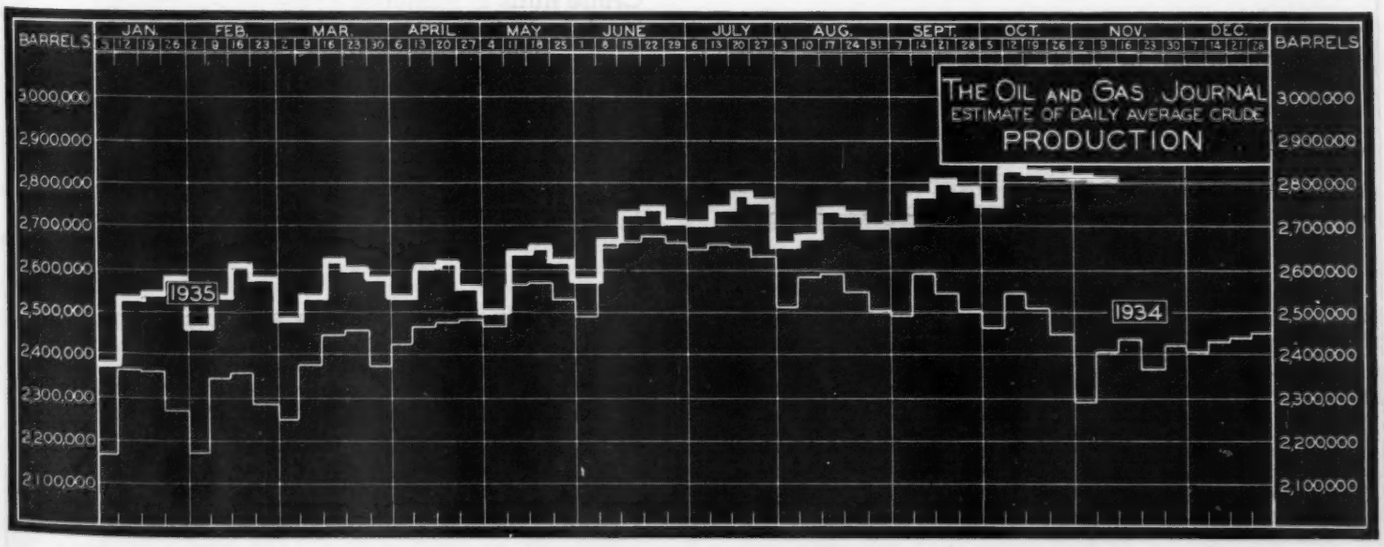
Two new pools recently opened in Barton County, Kansas, start off with wells of good production. All the wells completed in the Rodessa field in North Louisiana since November 1 have been given a 600-barrel daily allowable and the average daily production of the pool the past week was cut to 8,975 barrels, a nearly 20 per cent reduction from the output of the previous week. In California the extension of the Montebello field was further proven, but on the Kettleman Hills north dome a new well inside the proven area had to be put on compressor to make it produce.

Production 2,816,014
Decrease 3,150

A 10-cent price increase for crude announced by Pure Transportation Company and effective November 7 in the central Michigan fields, brings the price there to $1.12 per barrel. Following the advance in the Pennsylvania Grade fields and the partial readjustment of price schedules in California, the price advance in Michigan has given added strength to the hope of producers for a better general crude market.

Daily Average Production for Week Ending Nov. 9, Previous Week and a Year Ago

	Nov. 9 1935	Nov. 2 1935	Nov. 10 1934
Oklahoma City	144,200	134,425	151,350
Seminole-St. Louis	89,050	93,650	80,250
Remainder of State	257,325	264,325	227,350
Total Oklahoma	490,575	492,400	458,950
East Texas	456,890	457,270	420,525
West Texas	155,428	155,197	142,565
North Central Texas	84,730	84,510	83,750
Texas Panhandle	55,327	55,797	63,028
East Central Texas	44,363	44,449	43,515
Gulf Coast Texas	192,429	193,100	164,240
Southwest Texas	60,798	61,550	61,052
Total State of Texas	1,049,965	1,051,873	978,675
North Louisiana	30,800	33,020	23,830
Gulf Coast-Louisiana	127,530	128,097	82,421
Total Louisiana	158,330	161,117	106,251
Santa Fe Springs	55,000	55,500	39,500
Long Beach	76,500	76,900	65,150
Mountain View	38,250	36,800	10,100
Kettleman Hills	116,250	110,000	54,150
Remainder of State	398,000	382,300	320,600
Total California	684,000	661,500	489,500
Kansas	135,675	149,825	120,600
Arkansas	29,675	29,855	30,190
Eastern Fields	105,000	105,000	103,000
Michigan	50,733	55,654	26,421
Rocky Mountain area	112,061	111,940	96,160
Total United States	2,816,014	2,819,164	2,409,747



THE BULLETIN BOARD

President Byles told the American Petroleum Institute the public should be shown its vital interest in the choice between a competitive private industry to serve the public or a socialized industry to serve the political bread line. The oil industry challenges comparison on its service with any industry or the government itself.

The Scare of Scarcity is being used by false prophets to frighten people into federal control of the oil industry, President Byles said. There is every evidence, he declared, that the supply of petroleum products is adequate for generations.

Crude Prices were much discussed at Los Angeles, a majority appearing in favor of maintaining present schedule during the winter fearing increase now might stimulate production or increase runs and upset the market on the eve of expected upward movement in spring.

California Leaders regard conditions on the Pacific Coast as good. The general sentiment is to "let nature take its course," meaning that the head will soon be off a number of the most prolific fields and a tight crude market may be expected.

Situation in East Texas is not materially changed. Overproduction last week was placed around 33,200 bbls. daily and crude runs a little over 65,000 bbls. with the connected allowable 32,315 bbls. State has offered 60,000 bbls. of confiscated oil now in pit for sale.

Discovery of Oil in Continental Oil Co.'s No. 1 McCarty test, southeast of the Fitts pool in Pontotoc County, Oklahoma, has opened another field and seems to indicate a structure of major importance.

Oil Brokers are facing a new situation with the contraction which the spot market in gasoline has been undergoing and the corresponding expansion of contract business. Those brokers who have been guilty of loose office methods or shady transactions in the past now see clients slipping away from them. Those who have observed high business standards apparently have little reason for concern.

East Texas is coming to be seen as the key point in the gasoline market during the approaching winter, not only in the Mid-Continent, but, in view of the interrelation of all areas, throughout virtually all the territory east of the Rockies. Sane marketing practices have reduced the East Texas threat to a minimum since last spring, but the low-consumption season now approaching will impose a more critical test.

Complete Report on Oil prepared by recognized authorities answering all questions that have agitated the public, legislatures and congress has been authorized to be released by the American Petroleum Institute. Purpose is to make the industry as open to public inspection as "a gold fish in a bowl of water."

Crude Runs to refineries in the Mid-Continent during the month of November are continuing on practically the same level as those of October, according to estimates made at the first of the month. Total daily runs are estimated to be 523,275 bbls. daily, representing a decrease of 350 bbls. as compared to October.

Construction Work on both sections of the new 8-inch pipe line to serve Russell County and western Kansas fields is proceeding rapidly and the system should be ready to handle crude oil from this area early next February.

Institute Authorizes Release of Report Revealing Facts About Oil Situation

By ANDREW M. ROWLEY

LOS ANGELES, Calif., Nov. 13.—Subscribing to the policy of providing the consuming public, all members of the state legislatures and the congress, the industry itself and every other person interested with data covering every phase of the petroleum industry, the American Petroleum Institute at its sixteenth annual meeting which opened at the Biltmore Hotel here on Monday, has authorized the publication of a report which contains the answers to all questions relating to the oil business.

This report, the result of over two months of intensive work on the part of more than 100 experts drawn from all branches of the industry, and of recognized authorities outside the oil business, gives definite and authoritative data on the many subjects which have agitated the public, the industry and politicians for years.

As one member of the board of directors remarked: "Through this report the veil has been taken from in front of the oil business and we are as open to public inspection as a gold fish in a bowl of water. All the behind-the-door information and facts are now presented in complete detail so that every one may know the exact situation of the petroleum industry and, from the information presented, answer for himself the many questions which have arisen and been discussed by the industry, the public and those in public life."

Approval of the release of these data to the public easily is the outstanding accomplishment of the meeting here. Every effort will be made to get the facts into the hands of every person in the country as every citizen is vitally interested in the petroleum industry both as a consumer of its products and because of the vast importance of the oil business as an employer, a buyer of equipment and supplies from other industries and as the largest tax payer to government in the country.

The report is of especial value as it represents the best thought and information in the United States on the subjects covered. It is not the work of one company, one group or one organization.

Conclusions Reached

The conclusions reached in the report summarize the work of the committee:

1. There is every reason for confidence that the requirements of petroleum products to meet national needs and the demands of the consuming public will be met.

2. The known reserves are today well over 100 per cent larger than those estimated 10 years ago, or at any time previous to 1925. These reserves should not be drawn upon at a rate more rapid than will be consistent with the ultimate recovery from them of the maximum required products. Thus managed, the reserves, together with new discoveries, which on the basis of experience we may confidently anticipate, should relieve us of any possible apprehension regarding our supplies over the next 25 years.

3. At the expiration of this 25 year period, or indeed at any other future time, there will still be sound insurance against any crisis concerning petroleum supplies. This insurance includes the certainty of large additional recoveries from old oil fields, which are not estimated in the present survey, but which improved methods of recovery will assuredly make available. Beyond this, in the further background, are the practically unlimited reserves from substitutes (coal and oil shales) waiting to be developed whenever economic conditions justify. With greater confidence than has ever before been possible, the assurance can be given that requirements will be met.

4. Each generation is entitled to the use of those resources which it finds at its hand: but it is not entitled to waste them. The price for crude oil should always be such as to insure production in sufficient quantities, at a reasonable profit. Under these conditions, oil will be produced by the best methods and with a view to the largest ultimate recovery from each field. As conditions justify, we may confidently rely upon the continued development of better methods in recovery, and progressive economy in utilization.

5. Because transportation is so vital, the industry has developed—as part of its plant—a complete, articulated, economical, and independent

AXTELL J. BYLES
President, American Petroleum Institute

transportation system. This system perfectly meets the industry's requirements, and has no possible usefulness to any other industry. Therefore, we insist that no part of our transportation facilities should be severed from the body of the industry, such severance would inevitably impair efficiency, add to the expense of operations, and increase the cost of products to the consumer. There is no significant demand for pipe line divorcement but, rather, an overwhelming preponderance of opposition.

6. Unremitting prosecution of scientific research and practical experiment in refining have served the public's interest by multiplying the industry's products, widening their fields of usefulness, and reducing their costs. New demands have persistently arisen, and just as persistently have been met. New processes have been devised and old ones bettered, regardless of expense or effort. Versatility, adaptability, and economy have guided the industry's advance under the urge of competitive conditions.

7. Among employers and employes alike, there is such general satisfaction with labor conditions as we believe could be matched in few other industries. This is true as to wages, working conditions, and all factors which make for relationships of mutual confidence and loyalty: and throughout the years of depression employment has been maintained without sacrifice of traditional high standards.

8. In the last 15 years this industry has become the greatest single contributor to public revenues; it produces 11 per cent of all taxes paid into government treasuries. These excessive and discriminatory taxes add heavily to the prices which consumers must pay for petroleum products and are responsible for many of the industry's most difficult problems.

9. Government domination would remove the urge and paralyze the forces that have made for progress. It would mean calamity to the industry, and disaster to the public. The record shows how invariably the benefit of economies, invention, and improvement has been passed on to the public in lower prices, better products and service. On that record we bespeak a candid, considerate judgment—confident that it will favor continuance of the industry's independence and self-control.

10. This most typically American industry has been created in the last three-quarters of a century. No other industry has faced so complex a situation by reason of the peculiar and fugitive character of its raw material. It has met tremendous responsibilities both in peace and in war, and has never failed in their discharge. We have every confidence that it will not fail in the future, unless prevented by governmental restrictions.

Protest by Directors

The board of directors of the Institute considered the four questions propounded by the United States Chamber of Commerce and went on record as being opposed to the extension of federal jurisdiction into matters of state and local concern; to the exercising by the federal government of the spending power without relation to revenues; of government competition with private enterprise for regulatory or other purpose; and favored the proposal that all grants of authority by congress to the executive departments of the federal government should be within clearly defined limits.

No Action on Code

The board probably will not take any official action on the proposed code of fair marketing practices on which C. E. Arnott, vice president for marketing of the Institute and vice president of the Socony-Vacuum Oil Co. has been conferring with the industry for several months. Mr. Arnott hopes to present the code to the Federal Trade Commission for its approval. Mr. Byles seemed to express the general sentiment when he stated in his address at the general session yesterday: "Desirable and helpful as would be a simple set of rules such as this code contains, interdicting certain unfair marketing practices, I wish to state there is no dispositon on the part of the Institute to impose a code and unless a code can be evolved which will have the practically unanimous adherence and wholehearted support of the marketing branch of the industry, there should be no code."

Better Times Anticipated

The convention is an especially representative gathering of the oil industry. Improved conditions in the business and a widespread belief continued cooperation between the industry and the various state governments will result in still

better times are shown in the attendance at the meeting. Late Monday afternoon 1,635 men had registered for the convention, an unusually high figure for the first day. Conservative estimates are between 2,300 and 2,500 will register before the close of the meeting with many feeling this higher figure will be exceeded materially.

The general session yesterday at which Mr. Byles, Baird H. Markham and C. E. Arnott were speakers, attracted a crowd which filled the large ball room of the Biltmore as did the general session today at which Tom Anglin, special representative of Gov. E. W. Marland of Oklahoma, delivered the address prepared by Governor Marland, and Ernest O. Thompson, chairman of the Railroad Commission of Texas, and A. L. Weil, president of the General Petroleum Corp. of California were speakers. A last minute change in the program had Mr. Weil deliver the address on conditions in California instead of Charles S. Jones, president of the California Oil & Gas Association.

The group sessions on production, marketing and refining are well attended, the technical men at the meeting feeling the papers being presented are of especial value at this time.

Colonel Thompson's Address

Col. E. O. Thompson, in his address today, declared Texas is wholeheartedly and enthusiastically behind the interstate compact. He said they intend to make it a success if their cooperation can make it so, and that Texas believes the compact offers the only constitutional method for the solution of the common problem in the oil producing states. In regard to proposed federal legislation for the petroleum industry, Colonel Thompson said the demand for such type of legislation was assumed to come from the public, but that he had been unable to find any such demand from the consumer public. On the contrary he said the facts are that for the last 15 years the prices of petroleum products, except for taxes, have drifted irregularly lower and the quality of those products has improved.

In speaking of proposed legislation, Colonel Thompson said, "It has been the history of the American people that they will try social experiments only in time of emergencies and distress. In 1933 along with the tremendous flood of new deal legislation and the public urge behind it, legislation of this kind might have been enacted. Prosperity is now returning. The nation is now definitely set against further social experiments and I feel quite certain we have heard the last of the federal control movement.

"Texas wants a good price for crude oil. It is its largest industry and the entire commercial life of the state is stimulated by its prosperity. The income of many of our people and a substantial part of the revenues of the state depend upon it. I am convinced that the people of Texas do not want us to administer the oil law in a manner which would lower the price of crude oil. In fact they feel Texas oil should bring a somewhat higher price than it now brings."

The address of President Byles appears on page 87 of this issue of The Oil and Gas Journal.

Chicago will be selected as the meeting place for the seventeenth annual convention to be held next November according to all indications, and it is felt Tulsa will be selected for the mid-year meeting with the date probably the week before the opening of the International Petroleum Exposition or during the first part of that week, the Exposition opening on Saturday, May 16.

Election of Officers

Mr. Byles was reelected president, W. R. Boyd, Jr., executive vice president, K. R. Kingsbury, George A. Hill, C. E. Arnott and Jacob France, vice presidents, Mr. France taking W. G. Skelly's place. Otto Donnell was chosen treasurer succeeding D. J. Moran.

Nominations for Directors

At the general session Tuesday afternoon, the following nominations by the board of councillors for directors of the Institute were approved:

Production Group — Pacific Coast: W. C. McDuffie, Pacific Western Oil Co., Los Angeles; S. Belither, Shell Oil Co., San Francisco. Rocky Mountain: B. B. Brooks, Consolidated Royalty Oil Co., Casper, Wyo. Central United States: Burdette Blue, Indian Territory Illuminating Oil Co., Bartlesville, Okla.; C. F. Roeser, Roeser & Pendleton, Inc., Fort Worth, Tex.; J. Edgar Pew, Sun Oil Co., Philadelphia; Frank Phillips, Phillips Petroleum Co., Bartlesville. Eastern United States: O. D. Donnell, Ohio Oil Co., Findlay, Ohio.

Manufacturing Group — Pacific Coast: R. D. Matthews, Union Oil Co., Los Angeles. Rocky Mountain: T. A. Dines, Salt Creek Producers Association, Denver, Colo. Central United States: P. M. Miskell, Empire Refineries, Inc., Tulsa. Eastern United States: C. L. Suhr, Pennzoil Co., Oil City, Pa.

Distribution Group — Rocky Mountain: W. H. Ferguson, Continental Oil Co., Denver. Central

W. G. SKELLY

United States: E. G. Seubert, Standard Oil Co. (Indiana), Chicago. Eastern United States: W. T. Holliday, Standard Oil Co. of Ohio, Cleveland.

Transportation Group—Pipe Lines: D. S. Bushnell, Northern Group of Pipe Lines, New York. Tank Cars: L. J. Drake, Union Tank Car Co., Chicago.

Supply Group—John A. Geismar, National Supply Co., Toledo.

Natural Gas Group—T. B. Gregory, Manufacturers Light & Heat Co., Pittsburgh; William Moeller, Jr., Southern California Gas Co., Los Angeles.

Natural Gasoline Casinghead Group — D. E. Buchanan, Hanlon-Buchanan, Inc., Tulsa; W. K. Warren, Warren Petroleum Co., Tulsa.

Foreign Trade Group—Far East: H. D. Collier, Standard Oil Co. of California, San Francisco. Mexico and South America: Richard Airey, Asiatic Petroleum Co., New York.

At-Large Group—W. N. Davis, Phillips Petroleum Co., Bartlesville; Frank Coates, Henry L. Doherty & Co., New York; R. C. Holmes, New York; F. A. Leovy, Gulf Production Co., Pittsburgh, Pa.; J. F. Lucey, Lucey Petroleum Co., Dallas, Tex.; E. W. Marland, Ponca City, Okla.; H. C. Weiss, Humble Oil & Refining Co., Houston, Tex.; E. B. Reeser, Barnsdall Oil Corp., Tulsa; H. F. Sinclair, Consolidated Oil Corp., New York; J. W. VanDyke, Atlantic Refining Co., Philadelphia; J. D. Collett, O'Keefe & Collett, Fort Worth, Tex.; H. T. Klein, The Texas Co., New York; Jake L. Hamon, Dallas, Tex.; Alexander Fraser, Shell Petroleum Corp., St. Louis; N. V. V. Franchot, Olean, N. Y.

The board of directors elected the following as directors of the institute:

E. De Golyer, Felmont Oil Co., New York; Harry Moreland, Great Lakes Pipe Line Co., Kansas City; C. E. Arnott, Socony-Vacuum Oil Co., New York; J. Frank Drake, Gulf Oil Corp., Pittsburgh; W. S. Fitzpatrick, Consolidated Oil Corp., New York; W. M. Irish, Atlantic Refining Co., Philadelphia; E. T. Moore, Simms Petroleum Co., Dallas; Thomas A. O'Donnell, Los Angeles; W. S. S. Rodgers, Texas Co., New York; E. L. Smith, E. L. Smith Co., Inc., Mexia, Tex.; Paul G. Blazer, Ashland Refining Co., Ashland, Ky.; B. L. Majewski, Deep Rock Oil Corp., Chicago; A. Jacobsen, Amerada Petroleum Corp., New York; and T. T. Thompson, Jr., Pennsylvania Grade Crude Oil Association, Bradford, Pa.

Safety Awards

Awards for outstanding work in preventing accidents in 1934 were made to oil companies at the first general session. Fatalities in the industry in 1934 were decreased 17 per cent and severity of injuries decreased 11 per cent, whereas fatalities in all industries increased 11 per cent and severity of injuries increased 5 per cent.

H. N. Blakeslee, of Dallas, Tex., director of the Department of Accident Prevention, reported that the past four years compared with the previous four show a decline of 21.8 per cent in fatalities, of 44.8 per cent in injuries per 100 men, and of 24.9 per cent in days lost.

The Standard Oil Co. (Indiana) and subsidiary companies received the award for safety in all departments, the company's 39,232 employes showing only 4.16 disabling injuries per 1,000,000 hours work and only .33 day lost per 1,000 hours worked. A second award was made to Texas Pacific Coal & Oil Co. whose 1,317 employes had only 2.86 injuries per 1,000,000 hours work and lost only .28 day per 1,000 hours worked.

Departmental awards follow:

Refining: Continental Oil Co., Ponca City, Okla.; Standard Oil Co. (Indiana); Shell Oil Co., San Francisco; Union Oil Co. of California; Lincoln Oil Refining Co., Robinson, Ill.; and Wadhams Oil Co., Milwaukee, Wis.

Wholesale Marketing: Standard Oil Co. (Indiana); Standard Oil Co. of Pennsylvania, Philadelphia, Pa.

Retail Marketing: Standard Oil Co. (Indiana): Union Oil Co. of California, and Cities Service Oil Co., Chicago.

Wholesale and Retail Marketing: Texas Pacific Coal & Oil Co.

Drilling: Standard Oil Co. of California, San Francisco; and Texas Pacific Coal & Oil Co.

Production: Continental Oil Co.; Marathon Oil Co., Tulsa; and Hope Construction & Refining Co., Pittsburgh, Pa.

Natural Gasoline: Ohio Oil Co., Findlay, Ohio, and Shell Oil Co., San Francisco.

Oil Pipe Line: Magnolia Petroleum Co., Dallas, Tex.; Standard Pipe Line Co., Shreveport, La.; Union Oil Co. of California; General Petroleum Corp.; and Sun-Yount Lee Pipe Line Co., Dallas, Tex.

Gas Pipe Line: Panhandle Eastern Pipe Line Co., Kansas City, Mo., and Lone Star Gas Co., Dallas, Tex.

Seagoing Marine: The Texas Co., New York, and Atlantic Refining Co., Philadelphia.

Inland Marine: Magnolia Petroleum Co., Dallas, Tex.

Heads of the two largest business enterprises in the world, William A. Irwin, president of the United States Steel Corp., and William S. Farish, chairman of the board of the Standard Oil Co. (New Jersey) were among the 175 oil men and their wives who traveled to Los Angeles on the two sections of The Oil and Gas Journal's special train over the Santa Fe Railroad. This publication and the Santa Fe were highly complimented by those making the trip because of the equipment, arrangements and everything which went towards making the journey across the country a real pleasure.

Lion Buys Marathon Stations

LOS ANGELES, Calif., Nov. 12.—Col. T. H. Barton, president, Lion Oil Refining Co., El Dorado, Ark., announced here today his company has purchased all the filling stations in Arkansas of the Marathon Oil Co. and will operate them. The deal involves about 500 outlets and several hundred thousand dollars.

Discovery Well in Jesse Area Appears To Be on Structure of Fitts Pool Type

By L. G. E. BIGNELL

With the opening of a pool by Continental Oil Co.'s No. 1 McCarty in the SE SE NW section 12-1n-7e, not far from the town of Jesse in Pontotoc County, Oklahoma, and in the vicinity of the Fitts field, many speculations have been made as to the significance of this discovery.

The well is reported as capable of producing from 2,000 to 6,000 bbls. of 35-gravity oil, with as much as 20,000,000 feet of gas per day. The total depth is 4,621 feet and the producing horizon has been designated as the McLish of the Simpson section.

While the well at this writing has not been officially tested because of lack of tankage and pipe line connections, it is expected to prove of major importance and has created considerable discussion among the oil company executives and technical men, and especially geologists and land men. It apparently opens a new area of production with the finding of oil and gas in the McLish and with showings of gas in the Viola and Bromide formations higher up in the Ordovician section.

Developments in the Fitts field have definitely proven that pool to be of the anticlinal type with the major axis running nearly east and west, with the east end of the contouring on the Viola formation still open. In other words, the limits of the Fitts field are not as yet defined to the east.

Along the south side of the Fitts field there is a very marked fault known as the Franks fault. This is of more recent age than the producing formations of the field, so this particular fault has not played any important part in oil accumulations in the Ordovician sections in the Fitts field, but it does prove that oil originally entrapped in true structures does not necessarily escape if the region is later disrupted by earth movements.

There are, however, some en echelon faults within the producing formations in the Fitts pool related to the Fitts anticline because they were associated with the anticlinal folding and caused displacement of strata as much as 2,000 feet between offset wells.

The Franks fault immediately to the south of the Fitts field dies out to the southeast before it reaches the vicinity of Jesse. There is evidence of a fault with a southeast-northwest strike passing through sections 11 and 12 in Township 1n-7e, a little south of the Continental Oil Co.'s No. 1 McCarty. The outcrop of this fault is lacking further to the northwest, and there is a considerable distance between the end of the Franks fault and the point where evidence of faulting can be again picked up south of Jesse. What has happened in this region where traces of faulting are missing is one of the problems confronting the geologist. If the fault found south of Jesse is projected in a straight line to the northwest it will miss the southeast end of the Franks fault, and to introduce a series of curved lines between the ends of these two faults in order to connect them is hardly consistent mapping of good geological interpretation of the surface and subsurface evidence.

With the new well to the north of this major fault south of Jesse, which probably extends from the surface to the Arbuckle formation, it would again appear as though this fault has little or no influence upon the oil accumulated in the Ordovician formations to the north of it if the same line of reasoning is followed as applied to the known conditions in the Fitts field and the effect of the Franks fault upon that oil pool.

If this line of reasoning is to be followed further it will next be necessary to try to determine the direction of the major axis of this new anticline and again the analogy between this region near Jesse and the Fitts pool may be drawn upon, and it seems safe to assume the newly found field will have its major axis running in a northwest-southeast direction closely paralleling the strike of the fault to the south of the McCarty well.

Surface structure as generally mapped trends in a northwest direction from the Continental's McCarty well and apparently heads into the Fitts structure through section 32-2n-7e.

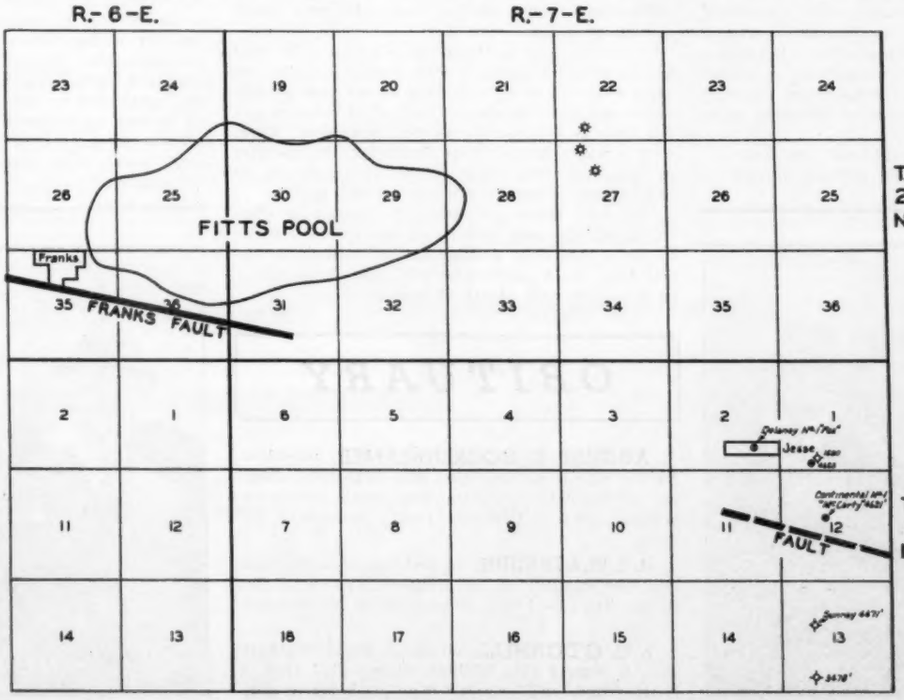
There are two dry holes to the south of the Continental Oil Co.'s No. 1 McCarty which have been considered in connection with this discovery as they are both south of the deep-seated fault and each in turn cut other minor faults it would seem there is no connection between the area south and the area north of the major fault passing through sections 11 and 12-1n-7e.

These wells south of the fault are known as Sunray-Mid Texas' No. 1 McCarty in the SW SE NW section 13-1-7, which cut a fault at —2,835 feet below sea level. The other well is Paramount Oil Co.'s No. 1 Graham in section 13-1-7, in southwest quarter of this same section and it cut the fault between Wapanucka and Mayes at about —1,200 feet below sea level. The Paramount well is south of the Sunray-Mid Texas well and plotting the relative positions of the points where the wells cut the faults indicates a sharp north dip of the formations. On the other hand plotting the log of the Continental's No. 1 McCarty north of the major fault and comparing it with the well drilled by Sledge and Lynch in SW NE SW section 1-1n-7e, indicates the formations are dipping to the northeast, but at a much lower angle than the dip of the formations south of the major fault.

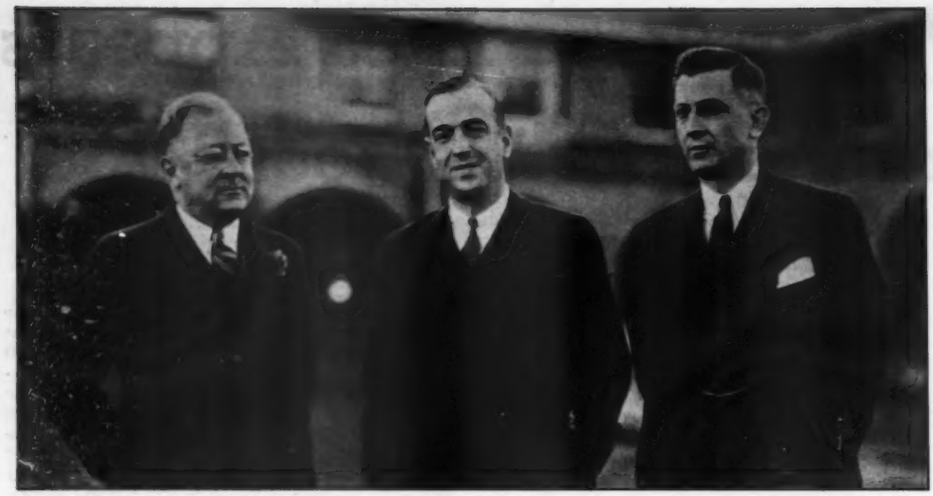
This leads to the opinion that the McCarty well is located upon an anticline. This anticline may be long and narrow and will have to be developed by drilling of wells. The Continental Oil Co. owns about 2,500 acres of leases immediately surrounding No. 1 McCarty well and it looks like their development campaign will determine to a large degree the shape and size of this structure upon which its discovery well is located.

Operators with land to the northwest of the discovery well, in the direction of Fitts pool, can make tests to determine whether this structure assumes a northwest-southeast direction, but without more evidence these wells would practically be wildcats and it is more probable the play will be developed by the Continental Oil Co. drilling wells as required by lease contracts and in so doing map out the productive area. It is generally agreed that a new field has been opened but geologists are by no means agreed upon the type or size of the structure nor the direction followed by its major axis. If the major fault south of Jesse were more clearly developed at the surface it would help a lot in determining certain fundamental facts regarding the area, for with the drilling up of the Fitts field it is now quite evident that Fitts is of the anticline or dome type of pools and that the oil and gas accumulated in the Ordovician formations before the Franks fault was created to the south of the field, and this major movement has had no appreciable effect upon the accumulated oil and gas in the Fitts pool other than to perhaps equalize pressure in the upper gas sands and also in the Viola, Bromide and McLish producing zones in the Ordovician sections.

Following this line of development it appears the Continental Oil Co.'s No. 1 McCarty is producing from formations dipping to the northeast and cut by a deep-seated fault to the south. The shape, size and direction of major axis of the new structure can only be determined by the drill although there is considerable geophysical evidence to indicate the trend will be to the northwest and the major question still to be answered is how long and wide will this anticline be when completely developed.



Regional map showing position of Franks fault and probable location of fault south of Continental Oil Company's No. 1 McCarty well, Pontotoc County, Oklahoma
(Map by R. C. Jacobson)



Henry S. Brown, Foster Wheeler Corporation, Sherman L. Smith, Foster Wheeler Corporation, and C. L. Knaak, American Roller Bearing Company

Maintenance of Crude Price Schedule Through Winter Considered Wisest

By ANDREW M. ROWLEY

LOS ANGELES, Calif., Nov. 11.—There is much discussion among oil men attending the annual meeting of the American Petroleum Institute here on the question of a crude oil price increase. A majority seems to be in favor of maintaining present schedules for crude oil and gasoline during the winter although there is a strong sentiment on the part of some, especially Texas operators, for an increase.

It is pointed out the period of minimum consumption is here and that present production of crude and manufacture of gasoline must be curtailed to permit the industry to enter next year in a sound position. Any action which might stimulate greater crude oil production or additional runs to stills might, it is said, result in a condition which would menace present prices and, possibly, cause a reduction of prices.

Many producing companies are confronted with a serious problem in the matter of drilling operations. Present proration practices, limiting a well's production to a small output daily, extend the period of full return on the investment to such an extent the financial burden is becoming quite heavy.

The feeling is universal that conditions have improved greatly and that the general outlook is good but a warning is being sounded that present crude oil production and runs to stills are too high and must be curtailed if the industry is to enjoy the full benefit of bettered conditions and enter next year in a position to still further profit from the increased demand it has experienced and which it is expected to experience during 1936.

A very large part of the oil industry in California regards the conditions here as good. K. R. Kingsbury, president of the Standard Oil Co. of California, said he thought so. Other executives expressed the same sentiment.

California oil men realize now as never before the state does not have the daily potential crude oil production heretofore attributed to it. There is very little proration in the state. Kettleman Hills could produce more oil than at present but it is producing about to the limit of its pipe line facilities and cannot produce more without a costly storage program.

Generally the sentiment here seems to be "Let nature take its course." That means it is felt the head soon will be off a number of the most prolific fields and small producers and small refiners will not have as much crude as they now have. Then, with a much tighter crude oil market, the operator or company with crude oil reserves will be, as one executive stated: "In the driver's seat."

No new fields are being discovered in California and the only promise of new reserves seems to be in very deep drilling, probably down to 15,000 feet. Such operations will limit development to operators with plenty of money.

A. W. McKenny and C. A. McCollum, of the National Supply Company

OBITUARY

AUGUST F. HOCKENBEAMER, president, Pacific Gas & Electric Co., San Francisco, Calif., one of the nation's outstanding public utility executives, died in Berkeley, Calif., yesterday.

R. J. BLACKBURN, 52, assistant treasurer and long-time employe of the Magnolia Petroleum Co., Dallas, Tex., died in a hospital there November 4.

J. C. O'DONNELL, president, Great Northern Tool & Supply Co., Billings, Mont., died from a heart attack on November 6 at his home in Billings. Mr. O'Donnell was well known in the oil industry having been an active worker in A.P.I. for several years while carrying on his business in Montana, Wyoming and Colorado. The company maintained branch offices at Kevin, Mont., Casper, Wyo., Denver, Colo., and Salt Lake City, Utah, and represented a number of well-known manufacturers as well as operating a large machine shop in Billings.

WILLIAM PETER McGARVIE, pioneer driller in Oklahoma and other fields, died recently at Las Vegas, Nev.

F. C. METZGER, 49, chief civil engineer of the Sun Oil Co. for the past 17 years died at his home in Dallas, Tex., from heart failure on November 3. He was born in Indiana, graduated from Purdue and attended the Wisconsin University two years.

Consumers N. R. A. Division Attacks Proration Policy

WASHINGTON, D. C., Nov. 11.—A report on the operations of the petroleum industry being completed by the Consumers Division of the National Recovery Administration, attacks practically all methods of conservation which the oil industry has attempted over the course of years and reiterates the cry that the whole scheme is a "smoke screen for price fixing devices." The Interstate Compact Act is decried as preserving the system of proration and allocation.

The report continues:

"The practice has been to develop more fields and drill unnecessary wells in order to be allocated a larger share of production. Overcapacity and its expense is tremendous, while overdrilling is costing the industry tens of millions a year. Under such circumstances, obviously the business can stay solvent only if the price is held above cost and far above the cost of efficient production. The consumer must pay the bill.

"Petroleum's overcapacity, if production were not restricted, would, of course, result in such low prices as would be ruinous to producers. Instances are on record where production has escaped restriction and the price of petroleum tumbled to a tenth of its usual levels. The question of price which the consumer must pay is carefully ignored. The market demand is the amount which will be used by refineries at the present price which covers high costs, not the amount which would find a market at various lower prices. The existence of a demand schedule is tacitly forgotten; demand is assumed to be a single figure. Price is definitely buttressed up by the restriction programs of the oil states. And the consumer pays the bill without even channels of protests. The administrative agency does not give fair representation. Only oil-producing states are represented and consumers in the thirty-odd states which buy oil having no production of their own, would be without voice even if consumers in the oil states could make their importance felt by their state commissions."

David Copeland, vice president, and J. P. McFadden, General American Tank Car Co.

En Route to A.P.I. Annual Meeting

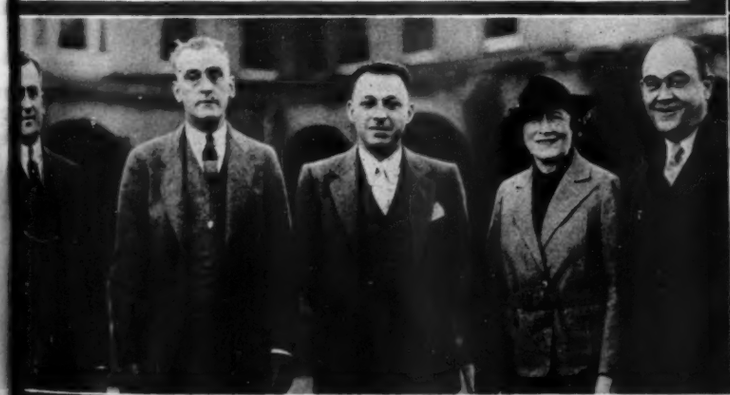
. S. Farish, chairman of the board, Standard Oil Co. (N. J.); J. Howard Pew, President, Sun Oil Co.; R. C. Holmes; R. A. Miller, Indiana Pipe Line Co.

Continental Oil Co. group: G. F. Smith, Walter Miller, J. J. Crosgrove, H. K. V. Tomkins, Harry Moreland, Great Lakes Pipe Line Co., in front, L. L. Davis, Bert H. Lincoln.

ficials U. S. Steel Corp.; Frank N. Speller, Chief Metallurgist, National Tube Co.; C. H. odge, Vice Pres. U. S. Steel Corp.; W. A. Irwin, Pres. U. S. Steel Corp.; Harry S. Hammond, representative, National Tube Co.; Robert Gregg, Vice Pres. U. S. Steel Corp.

Mrs. J. H. Wilson and Mr. Wilson, Secretary W. Virginia Oil and Gas Association.

K. G. McKenzie, Texas Co.; Comte De Lubersac, manager Texas Co. of France.



Warren Kinsman, Du Pont Co.; C. P. Holmes, Western Actuarial Bureau; Julius Loeffle Commerce Pet. Co.; Mrs. A. W. Hartigan; A. W. Hartigan, Filtrol Co. of California.

. R. C. Osterstrom, A. M. Brereton, R. C. Osterstrom, Mrs. Geo. C. Morris and Mr. Morris, Pure Oil Co.

Back row—O. P. Cottrell and F. T. Manley, Texas Co., W. J. Curley, Penn. Conley Tank Car Co.; Mrs. H. A. Gidney, Mr. Gidney, Gulf Oil Corp.; T. E. Ward, Oil Field Equip. Co. Front row—J. E. Pogue, S. T. Pike, Case Pomeroy Co.; E. S. Hall, Standard Oil Co. (New Jersey).

En Route to A.P.I. at Los Angeles on t

I. E. Duggan, Okla. Conservation Dept., and Mrs. I. E. Duggan; Ted R. Miller, Taubman-Supply Corp., and Mrs. Ted R. Miller

"All Aboard!!"

W. K. Warren, Warren Petroleum Co., and Mrs. W. K. Warren

Fred E. Cooper, Fred E. Cooper Co.; R. T. Lyons, Skelly Oil Co.; V. P. Rollman, Santa Fe R.R. Co.

K. R. Teis, E. H. Moore Oil Co., and Mrs. K. R. Teis

C. W. Flint, American Steel Derrick Co.; H. L. Dickson, Parkersburg Rig & Reel Co.; E. I. Hanlon and A. E. Bradshaw, National Bank of Tulsa

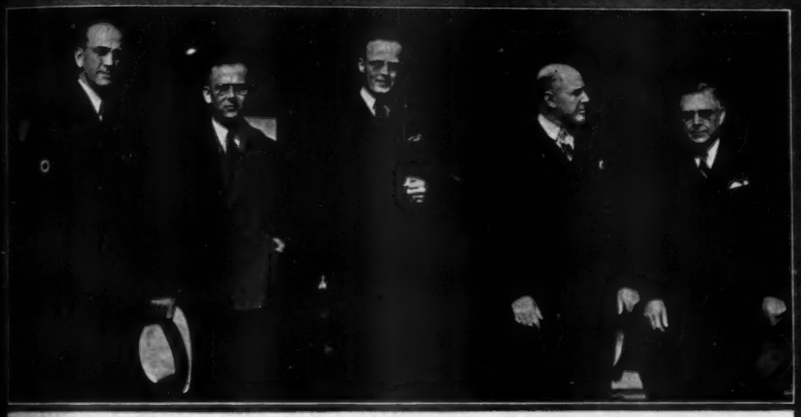
(Left) A. J. Kerr, Pittsburgh Equitable Meter Co., and J. P. Flanagan

(Right) G. M. Welling, E. H. Moore Oil Co., and J. E. Richard, National Tank Co

the Oil and Gas Journal Special

Rush Greenslade, Gypsy Oil Co., and Mrs. Rush Greenslade

Neil Buckley, Cities Service Export Oil Co.; H. G. Texter, Spang-Chalfant Co.; H. R. Leland, Leland Equipment Co.; J. J. Larkin, Larkin Torpedo Co.



J. A. McCollum and D. G. Mann, National Supply Co.; D. A. Sikes, Baroid Sales Co.; W. B. Way International Petroleum Exposition; D. M. Hammett, Axelson Manufacturing Co.

red Cook, Sinclair Prairie Oil Co., and Frank Hinderliter, Hinderliter Tool Co.

W. L. Connelly, Sinclair Prairie Oil Co.

R. Otis McClintock, First National Bank & Trust Co. of Tulsa

A. F. Winn, Skelly Oil Co., Mrs. A. F. Winn, and Elmo Thompson, First National Bank & Trust Co. of Tulsa

F. T. Hopp, Skelly Oil Co., and Chas. Krause, Lee C. Moore Co.

E. H. Moore, E. H. Moore Oil Co., Mrs. E. H. Moore, Mrs. Levi Ackley, Mrs. G. M. Welling, A. G. Tydings, and Levi Ackley, E H. Moore Oil Co.

Pipe Line Progress

Michigan Utilities Commission Hears Pipe Line Petitions

MUSKEGON, Mich., Nov. 11. — The Michigan Public Utilities Commission has indefinitely postponed taking additional testimony on the petition of A. Thomas Sarkisson, of New York, for permission to construct a $2,500,000 natural gas pipe line from the central Michigan fields to Detroit.

An application by Alfred H. Doughty, former mayor of Lansing and head of the Central Michigan Gas Corp., for a permit to lay a gas line from the central Michigan fields to Lansing has been taken under advisement.

The permit previously granted to the Gas Corp. of Michigan, of Mount Pleasant, to build gathering and transmission lines for transporting natural gas from the Clare County field to Clare, Mount Pleasant, Rosebush and other nearby communities has been transferred to the Central Michigan Pipe Line Corp., a new $20,000 concern organized by James A. Mercier and James A. McKay, of Detroit.

The Michigan Public Utilities Commission is considering a petition for approval of the purchase of 16 miles of pipe line from the Refineries Fuel Supply Co., of Alma, Mich., by Mid-West Oil & Gas Corp. Mid-West also seeks permission to extend its lines into Gratiot County, Michigan, a request on which the state commission has requested further testimony.

Petition of the Petroleum Transportation Co. to extend its gathering lines in Montcalm County was protested by well owners at a hearing before the Michigan Public Utilities Commission. The land and well owners claimed extension of the company's gathering system to their properties would force the price of gas below a profitable level for future development. The company proposes to gather the gas, paying 9 to 12 cents at the well, and resell it to the Consumers Power Co. Well owners seek at least 15 cents at the well head.

Oklahoma Natural Pipe Line Division Safety Award

The pipe line or transmission division of the Oklahoma Natural Gas Co. was awarded one of the plaques at the National Safety Council congress at Louisville, Ky., for its record during the safety contest of the petroleum section of the council from January 1 to July 1, 1935.

During the period of the contest this group of employes did not register a disabling accident. In several company districts notable safety records are being maintained, the Muskogee district is on its fourth year, without sustaining a disabling injury.

The Oklahoma Natural Gas Co. ranked second in the national safety council fleet contest for large fleet group. There were approximately 40 units in the contest. The winner was Sinclair Prairie Co. of Tulsa.

Construction Well Under Way Rio Grande Valley Line

SAN ANTONIO, Tex., Nov. 11.—Construction is well under way on the 35-mile industrial gas line in the Lower Rio Grande Valley. The new welded line will connect the Samfordyce field in western Hidalgo County with two pumping stations in control and improvement district No. 2 of the Rio Grande Valley irrigation system. Located near the town of Hildalgo, Tex., on the north river bank across from Reynosa, these pumping stations lift the river water in two stages to feed the district irrigation canals.

Construction of the line was let to the Fredell Construction Co. of Houston. The newly formed Hidalgo Gas Co. of McAllen, Tex., owner of the line, is controlled by Murchison & Closuit, Inc., of Dallas, T. F. Murchison, president, and E. M. Closuit, vice president. Associated with them in this company are Showers & Moncrief of Houston, operators in the Samfordyce field, and Roy Moyston of Rockport. The gas company is one of four associated oil developments in the Rio Grande Valley. The other units are the Valley Pipe Line Co., operating a recently completed oil line from Samfordyce to deep water at Port Isabel, Coastal Refineries, Inc., now completing a 5,000-bbl. refinery at Port Isabel, and the Port Isabel Terminal Co., owner of the pipe line terminal at the refinery site.

The new gas line will extend eastward from the Samfordyce field, following the oil line right-of-way to a point near the town of Madero. It then divides leading to the two stations. The pipe is delivered in 40-foot random lengths. A protective coating for the line, the same as that used on the new oil pipe line is being applied.

At the present time, pipe is strung for a distance of 10 miles east of the field. A ditching machine providing depth for 2-foot coverage is preceding the welding crews who have completed 7½ miles of connection. All but three carloads of the pipe which are en route, is on the site unloaded at three points; Hidalgo, Madreo and Samfordyce. The pipe was transported from the eastern seaboard to Galveston whence it was shipped by rail to the Valley. At the present rate, it is estimated that the line will be installed and ready for operation by December 1. A. J. Hardendorf, Fredell's associate in the construction company is supervising the work.

Cleaning machine cleaning 20-inch pipe as it is taken out of the ditch. Winch for holding up pipe while cleaning machine runs over it, is shown ahead of the cleaner

Second Pumping Station Being Added for Valley Pipe Line

SAN ANTONIO, Tex., Nov. 11.—Installation of a second pumping station in the 88-mile oil pipe line of the Valley Pipe Line Co. of McAllen, Tex., began last week. The unit is being added at the midway point in the line, in Lot 3, Block 2 of the American Rio Grande Land & Irrigation property, 3½ miles south of Mercedes. One 75-horsepower Worthington diesel engine driving a Worthington pump, equipment identical to that in the field pumping station is being installed. The principal object of the second unit was to decrease the pressure on the line necessary to flow 4,800 bbls. per day of Samfordyce crude from the field in western Hidalgo County to Port Isabel on the Gulf. Accordingly, the liners in the field pump have been changed from 3¾ inches to 4½ inches to correspond to those in the new pump. This will facilitate the movement of 4,800 bbls. per day of oil with pressures not exceeding 500 pounds. Sufficient storage is also being erected at the midway station.

At the Port Isabel end of the line, additional storage is being projected, to allow the concentration on the site of enough oil to make a full tanker cargo of crudé oil. At present, storage at the terminal includes 55,000 bbls. for crude, 55,000 bbls. for furnace oil, 25,000 bbls. for gas oil and 25,000 bbls. for gasoline.

Michigan Refiners to Petition Board to Modify Order

Several small independent refinery operators in Michigan last week petitioned the Michigan Public Utilities Commission to qualify its order of approval for construction of a 140-mile pipe line being laid from the Crsytal field in central Michigan to Toledo by the Michigan-Toledo Pipe Line Co. The independents claim their supply of crude will be shut off if the corporation, formed on a 50-50 basis of ownership by the Simrall Pipe Line Co. of Mount Pleasant, Mich., and the Standard Oil Co. of Ohio, is granted permission to operate the new 25,000-bbl. line under the present setup. They seek to force a guarantee of crude before any is transported out of the state.

The pipe line operators argue the refiners' move is an attempt to block outstate markets for Michigan crude. The new line is a $1,000,000 project to be operated on a common carrier basis. Issuance of a final order was delayed 10 days to allow both sides to file a brief. In the meantime construction of the line is being rushed to completion before severe winter weather increases building costs.

Loma Novia Gathering Lines

Gathering lines of the Humble Pipe Line Co. in the Loma Novia field of Duval County, Southwest Texas, have been extended to include the following leases: Eastern Petroleum Co., Rosan Oil Co., and Rodney DeLange on the Mary C. Hubbard and Nellie DuVon land in Surveys 71 and 76.

Natural Gas

Natural Gas Hearings Begun By Trade Commission

WASHINGTON, D. C., Nov. 11. — During the week the Federal Trade Commission heard testimony concerning the natural gas industry designed ultimately to be the basis for recommendations covering federal control from the producing fields down to retail distribution. This fits into the picture of attempts to give the federal government control of the oil industry.

The testimony stressed mainly wastage in the Texas Panhandle, but did not bring out the legislation passed by Texas or the desire of operators to improve production methods to conserve the gas.

Mr. Fisher, of Detroit, stated there had been so much gas wastage in the Panhandle the first eight months of 1935 that, if continued, it would exhaust the field in 10 years, although if properly conserved, the field should be able to produce for 100 years. The future of the field depends entirely on how the act is administered, he said.

The only other witness was Frank P. Parish, organizer of the Missouri-Kansas pipe line group. Individual companies will be called to testify from time to time.

It is expected the report on the investigation will be ready for congress in January, and it is thought probable recommendations for legislation on federal control over production, transmission and distribution of natural gas will be included.

Texas Appeals Court Upholds Rate Cut in Laredo Case

AUSTIN, Tex., Nov. 11.—The Third Court of Civil Appeals has decided in favor of the State and the Railroad Commission the appeals of United Gas Public Service Co. in the Laredo gas rate case.

The Railroad Commission had reduced the burner tip rate in Laredo from 75 cents per 1,000 feet to 55 cents. The gas company instituted suit

in the Federal Court at Austin to enjoin the enforcement of the rate reduction order on the ground it was confiscatory.

The Attorney General's Department removed the litigation to the State District Court in Travis County, where a jury verdict was found and a judgment entered upholding the reduced rate as just and reasonable. The gas company prosecuted two appeals from the judgment in the Court of Civil Appeals, the first, upon the ground that the case should have been removed to Harris County for trial upon the company's plea of privilege, which plea was overruled, and the second, from the determination in the main case upon merits.

The trial court refused to award the city of Laredo refunds retroactively to the original date of the Railroad Commission's rate reduction order, the difference between the reduced rate and the higher rate which the gas company had continued to charge. The Court of Civil Appeals reformed the judgment of the trial court to include these back refunds in favor of the consumers, and as so reformed, the judgment of the trial court was affirmed. The State, Railroad Commission and city of Laredo had complained by cross-assignments of error on appeal of the trial court's refusal to grant these back refunds.

Texas Rate Case Is Remanded to Travis District Court

AUSTIN, Tex., Nov. 11.—The Third Court of Civil Appeals at Austin has reversed and remanded to the District Court of Travis County the case of the state and others vs. Public Service Corp. of Texas. The Public Service Corp. of Texas operates a gas pipe line system serving the towns of Spearman, Canadian, Booker, Perryton, Wakar, Farnsworth, Glazier and Higgins, in Texas, and the towns of Shattuck, Gage, Fargo and Supply in Oklahoma. It owns and operates also the distribution systems in all of the Texas towns named except Spearman, where it sells gas wholesale at the city gate to an independent distribution company.

The Railroad Commission on November 26, 1934, promulgated an order fixing a uniform wholesale gate rate of 27 cents per thousand feet, to be observed by the Public Service Corp. pipe line system, and ordered the company not to charge or compute as an operating expense any sum in excess of that amount for gas delivered at the city gates of the cities and towns in Texas served by its pipe line system. The company brought suit in the District Court of Travis County against the Railroad Commission and other state authorities seeking an injunction to restrain them from the enforcement of order upon the ground the rate was unreasonable and unjust, and a confiscation of property. The Railroad Commission and the state filed an answer and cross-action alleging the reasonableness of the order and seeking the enforcement by injunction.

District Judge C. A. Wheeler on May 13, 1935, sustained the Railroad Commission's general demurrer to the company's petition, and sustained the company's general demurrer to the commission's petition, thus holding that neither side had alleged facts entitling it to the relief sought. The state and Railroad Commission appealed from that ruling which ruling the Court of Civil Appeals held to be erroneous, and, therefore, reversed the cause and remanded the same to the trial court to try out the issue of whether the rate fixed was reasonable.

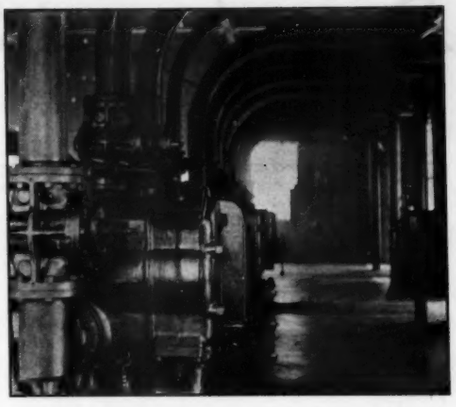
Greenville, Mich., Franchise

MUSKEGON, Mich., Nov. 11.—Residents of Greenville, Mich., probably will be asked to vote on an application of the Gas Corp. of Michigan for a 30-year natural gas franchise at an early special election. The proposal already has been laid before the Greenville city council.

Propose Municipal Plant

Officials of Deming, New Mexico, are reported compiling data to present to the government for federal aid in a projected natural gas distributing system. It is seeking a $40,000 loan from the Public Works Progress Administration it is said. Gas would be obtained from the Southern Union Gas Co.'s line to Albuquerque.

Natural Gasoline



Part of the compressor unit in the Shell natural gasoline plant, Lucien pool, Oklahoma

United Carbon Now Operating Three Units at Sanford

The United Carbon Co.'s large carbon black plant at Sanford, Hutchinson County, in the Panhandle gas field, started production on November 7 on three of its five units. The three units have a daily capacity of around 10,000,000 feet of sour gas daily and can produce around 40,000 pounds of carbon black. The remaining two units, now under construction, one of which is to be completed in another week and the other the latter part of December, will each handle around 10,000,000 feet of gas daily.

Each unit is composed of 64 hot houses, each house extending 144 feet in length, 11 feet in height and 12 feet in width. The entire plant covers between 20 and 25 acres and 325 men are to be employed when all units are producing, 250 men being employed at the present time. Electricity is used for power in the plant.

Refinery Projects

Construction Started on New 200-Bbl. Shaunavon Plant

SHAUNAVON, Saskatchewan, Nov. 11.—Construction is under way of a refining plant of from 200 to 250 bbls. daily capacity for Shaunavon Oil Refineries, Ltd. The company, financed largely by Saskatchewan capital, has the following directors: A. D. Kennedy, Moose Jaw (president); B. V. Hole, Newcastle, Wyo.; Dr. J. B. Swanson, Shaunavon, Saskatchewan; Harry Ostlund, Eastend; A. C. Running, Admiral. B. V. Hole of Newcastle, Wyo., has the construction contract and will be in charge of operations and the refining staff will include Joseph Newton of Gillette, Wyo., and Ralph Watson and Leonard Shell of Newcastle, Wyo.

Crude will be imported from Montana, Wyoming or Texas and the refinery output will include gasoline, tractor fuels and greases. The plant is expected to be in operation by the end of the year.

Spartan to Resume Operations Soon at Shreveport Plant

The Spartan Refining Co. is starting reconditioning work on its Shreveport, La., plant with the view of placing the refinery in operation in the next three weeks. The plant, which is of 12,000-bbl. capacity, has been shut down for the past 10 months. Complete topping facilities and Gyro cracking clay-treatment-polymerization equipment are included in the plant refining facilities. Minor repairs in piping and furnace linings and small changes in equipment arrangement amounting to approximately $16,000 were major items included in the reconditioning program prior to opening.

Plans for reopening the plant immediately followed the recent approval by federal court in Shreveport of a plan for reorganization of Atlas Pipe Line Co. and Spartan, a subsidiary of the former. It was said that the plan has been accepted by at least two-thirds of holders of claims of each class, including bondholders and by Alco Products, Inc. and Gyro Process Co. under whose patents the cracking plant will be operated.

Enlarge Old Dutch Refinery

A 50 per cent increase in capacity of the Old Dutch Refining Co. plant at Muskegon, Mich., was announced today by John Borden, president.

About $10,000 will be expended for installation of a new tube still at the Muskegon plant under plans developed by Dr. Clive M. Alexander, of St. Louis, Mo., prominent consulting engineer formerly associated with the Shell Petroleum Corp. for about two years. Dr. Alexander is spending one week a month at the Old Dutch plant.

Construction of the new still will be started before the close of November and is scheduled for completion in about 30 days, or before January 1. It will increase the daily crude capacity from 3,000 to 4,500 bbls.

Phoenix Sells Houston Plants

Sale of the two former Phoenix Refining Co. plants in Houston, together with two tracts of land, a connecting pipe line, oil equipment and leases and a quantity of crude has been consummated between Raymond Russell of San Antonio and Frank W. Bennett of Houston, buyer. Plans call for the modernization of both plants to be operated under the name of the Bennett Refining Co., Frank Bennett president and Clyde V. Shuford, vice president. Mr. Bennett owns producing properties in East Texas and Louisiana.

Plans Refinery Expansion

TORONTO, Ontario, Nov. 11.—Goodrich Oil Co. of 3509 Danforth Avenue, Toronto, has completed plans for a $20,000 addition to its refining plant.

Strathroy Gas Project

STRATHROY, Ontario, Nov. 9.—Ratepayers of Strathroy at the municipal elections on December 2 will vote on the granting of a natural gas franchise to the Union Gas Co. of Chatham. It is proposed to supply the town from the transmission line recently laid from the Dawn field to London. The proposal will involve the constructing of a complete local distributing system.

Ontario Gas Survey

OTTAWA, Canada, Nov. 9.—Geological surveys conducted this season in southwestern Ontario under supplementary provisions of the Public Works Act disclosed little likelihood of a natural gas shortage for several decades, the Federal Mines Department has announced. The surveys found that extensive drilling had more than overcome a shortage that threatened in 1933, while recent geological mapping has called attention to additional areas where drilling is likely to be successful.

Mid-Continent Refining Schedule for November Remains at Same Level

By D. H. STORMONT

According to estimates made at the first of the month, November crude runs to refineries in the Mid-Continent will continue at practically the same level as the October schedule. While the total daily runs will average 523,275 bbls., a slight decrease of 345 bbls. from the October total, most of the eight districts report slight increases. The East Texas district shows the greatest exception in that runs are estimated to be curtailed by 9,900 bbls. a day. In North Louisiana schedules are being continued without changes in most cases. Oklahoma, Texas Panhandle, and Kansas are increasing their runs by approximately 3,000 bbls. each. In Kansas the Cusco Oil & Refining Co. is now operating the former Security Pet. plant in Chase. The Hutchinson Oil & Refining Co. is also scheduled to resume operations within the next few weeks following a refinancing program. The plant located in Hutchinson has been closed down for more than a year.

Refiners in Arkansas with runs totaling 20,450 bbls. daily, or 1,770 bbls. less than in October followed East Texas in the amount of decrease. Lion Oil and Root Refining Co's., with decreases of 1,000 bbls. each, make up the great part of the reduction, most other refineries continuing on the same schedule as of October. Southwest Texas with a decrease of 610 bbls. is the other district to show a decrease in daily runs to stills. In districts showing increases in refining schedules, resuming of operations in some plants and slight increases in runs to stills account for the enlarged figures. Globe Oil & Refining Co. is now operating its Blackwell plant, processing 3,000 bbls. of crude daily. Admiral Refining Co. has shut down its Kilgore plant, also Condor Refining Co. and Heath Refining Co.

East Texas

East Texas refiners are continuing to hold their daily runs at a relatively low figure, the policy in many cases being to curtail operations to conform with demand. About 50 per cent of the plants in this district are operating and a large number of the plants now idle are expected to never resume operations. This district has a total refining capacity of approximately 229,650 bbls. daily and of this total capacity only 33 per cent is being utilized according to available figures. In November, 1934, there were 94 plants located in East Texas with a total capacity of 221,970 bbls. daily or an average capacity of 2,360 bbls. Comparing this average figure with the November, 1935, average figure of 2,800 bbls. per refinery shows that the trend is to larger and fewer refineries.

There continues to be many changes through purchase and ownership transfers of one kind or another of refinery property in the Mid-Continent and especially East Texas. Dominant Refining Co. is now operating the Kilgore plant formerly known as Johnson & Burnham; Carnation Refining Co. is changed to the Holmes Refining Co. of Gladewater; the Matthews Refining Co. plant at Gladewater succeeds the Alton Refining Co.; and the Riverside Refining Co. plant at Gladewater is now owned by the North Texas Refining Co. In Southwest Texas the Bee Oil & Refining Co. has sold its plant located in Pettus to the Midway Oil & Refining Co. Plans of the new company are that the products refined in its plant will be distributed through the 25 or 30 service stations owned by the Midway Service Distributing Co.

Refinery Construction

Several new or reconstructed plants are now operating or are expected to begin production sometime during the month. Pettus Oil & Refining Co. is now operating its newly constructed plant at Mathis, Tex., topping approximately 700 bbls. of crude daily. The Exchange Petroleum Corp. of Albany, has completed and put into operation a new pipe still thus increasing its daily capacity from 500 to 1,200 bbls. Reorganization of the Atlas Pipe Line Co. and consolation of its subsidiary, the Spartan Refining Co. of Shreveport, resulted in plans for reopening the refinery by the first of December. Reconditioning plans call for an outlay on approximately $16,000 to be spent in repair work on the refinery which has been closed since the first of the year. Solvex Refineries, Inc. has not as yet finished constructing its plant purchased a few months ago from the Culver interests. Construction on an additional cracking unit in the Kilgore plant of the Utah Refining Co. will soon begin, resulting in increasing its capacity from 3,000 to 5,000 bbls. when completed.

According to Bureau of Mines estimates, gasoline consumption for the first eight months of 1935 set a new high record. The consumption for this period was 5.4 per cent higher than in the corresponding period of 1934, and 4.8 per cent over a like period of 1931, the previous peak year. The bureau also forecasts that final figures for the current year will at least show a corresponding increase with November's consumption rated at from 4 to 10 per cent higher than that of November, 1934. This knowledge coupled with the fact that refiners are receiving one-half cent more per gallon for gasoline, other refined products also being higher, shows that the refining outlook in the Mid-Continent is considerably brighter this month that it was a year ago. With California's overproduction now removed, the even schedules of operation through the area point to a much stronger market for refined products.

Mid-Continent Crude Runs

Average Daily (Barrels)

(Advance estimate compiled by The Oil and Gas Journal)

	1933	1934	1935
January	399,405	448,360	426,070
February	407,125	456,619	448,810
March	423,445	465,680	451,510
April	441,000	458,220	467,765
May	470,460	457,165	466,015
June	479,987	459,908	485,015
July	525,845	477,012	494,210
August	518,510	501,750	508,960
September	526,749	499,830	541,080
October	495,756	500,755	523,620
November	481,335	500,445	523,275
December	434,275	440,735	.....

Operations by Refinery Districts

	Dly. crude runs		
	Nov.	Oct.	Decr.
Arkansas	20,450	22,220	1,770
East Texas	76,070	85,970	9,900
Kansas	121,770	118,690	*3,080
N. Central Texas	41,185	38,940	*2,245
North Louisiana	22,350	23,350	1,000
Oklahoma	152,370	149,310	*3,060
Southwest Texas	29,350	28,740	*610
W. Tex.-Panhandle	59,730	56,400	*3,330
Total	523,275	523,620	345

*Increase.

Estimated Daily Average Mid-Continent Refinery Crude Runs

ARKANSAS

Company and location—	Daily capacity	Av. daily runs— Nov.	Oct.
Berry Asphalt Co., Waterloo	2,000	1,200	970
Henry H. Cross Co., Smackover	6,000	4,000	4,000
Lion Oil Ref. Co., El Dorado	12,000	8,000	9,000
Macmillan Pet. Products Co., Norphlet	2,500	2,000	2,000
Ouachita Valley Ref Co., El Dorado	2,500	(*)	(*)
Root Ref. Co., El Dorado	10,000	5,000	6,000
Simms Co., Smackover	2,000	(*)	(*)
Stephens Ref. Co., Stephens	750	250	250
Total	38,750	20,450	22,220

*Shut down.

KANSAS

Barnsdall Oil Co., Wichita	4,000	3,000	3,200
Cusco Oil & Ref. Co., Chase	2,100	700	1,000
Derby Oil Co., Wichita	8,000	4,500	5,500
Dickey Ref. Co., McPherson	2,500	1,700	1,700
Eldorado Ref. Co., Eldorado	5,000	2,500	2,500
Falcon Ref. Co., Inc., Great Bend	1,200	550	680
Globe Oil & Ref. Co., McPherson	10,000	8,000	8,000
Kanotex Ref. Co., Arkansas City	12,000	8,500	7,500
Kansas Gasoline Co., Winfield	500	40	40
Krenger Ref. Co., Laton	150	50	55
National Ref. Co., Coffeyville	8,000	7,150	4,000
Pet. Products Co., Chanute	1,000	950	1,000
Phillips Pet. Co., Kansas City	18,000	13,230	12,100
Russell Ref. Co., Russell	1,000	(†)	(†)
Shell Petroleum Corp., Arkansas City	20,000	16,000	17,000
Sinclair Ref. Co., Coffeyville	20,000	9,000	9,000
Sinclair Ref. Co., Argentine	9,500	7,500	7,500
Skelly Oil Co., Eldorado	23,000	16,500	16,000
Socony-Vacuum Oil Co., Inc., Augusta	16,000	14,500	15,000
Standard Oil Co., (Indiana), Neodesha	20,000	4,500	4,500
Hutchinson Oil & Ref. Co., Hutchinson	1,500	(*)	(*)
Vickers Pet. Co., Potwin	3,500	2,500	2,500
Total	179,950	121,770	118,690

*Shut down. †Constructing.

OKLAHOMA

Company and location—	Daily capacity	Av. daily runs— Nov.	Oct.
Anderson-Prichard Oil Corp., Cyril	6,000	4,500	4,500
Associated Pet. Corp., Allen	5,000	(*)	(*)
Barnsdall Oil Co., Barnsdall	6,000	3,500	3,500
Barnsdall Oil Co., Okmulgee	10,000	3,500	3,500
Bell Oil & Gas Co., Grandfield	4,500	3,200	3,200
Black Gold Ref. Co., Oklahoma City	2,000	1,400	1,400
Century Pet. Corp., Oklahoma City	2,500	(*)	(*)
Champlin Ref. Co., Enid	16,000	6,500	6,500
Continental Oil Co., Ponca City	30,000	16,000	18,000
Crescent Ref. Co., Holdenville	1,000	(*)	(*)
Cushing Ref. & Gasoline Co., Blackwell	1,700	1,600	1,500
Cushing Ref. & Gasoline Co., Cushing	6,200	4,300	4,100
Deep Rock Oil Corp., Cushing	10,000	9,000	9,000
Eason Oil Co., Enid	5,000	3,000	2,800
Empire Oil & Ref. Co., Okmulgee	4,000	2,250	2,420
Empire Oil & Ref. Co., Ponca City	12,000	8,000	7,000
Globe Oil & Ref. Co., Blackwell	7,500	3,000	(*)
Government Ref. Co., No. 1, Oklahoma City	1,000	(*)	(*)
Government Ref. Co., No. 2, Oklahoma City	3,500	(*)	(*)
Government Ref. Co., No. 3, Seminole	800	(*)	(*)
Hanger Ref. Co., Oklahoma City	1,000	(*)	(*)
Johnson Oil Ref. Co., Cleveland	6,000	4,000	4,000
Major Pet. Products, Oklahoma City	2,000	400	400
Marathon Oil Co., Bristow	5,000	2,500	2,500
Mid-Continent Pet. Corp., West Tulsa	40,000	19,000	19,000
Monarch Ref. Co., Oklahoma City	1,000	900	900
Omar Ref. Co., Garber	8,000	2,500	2,500

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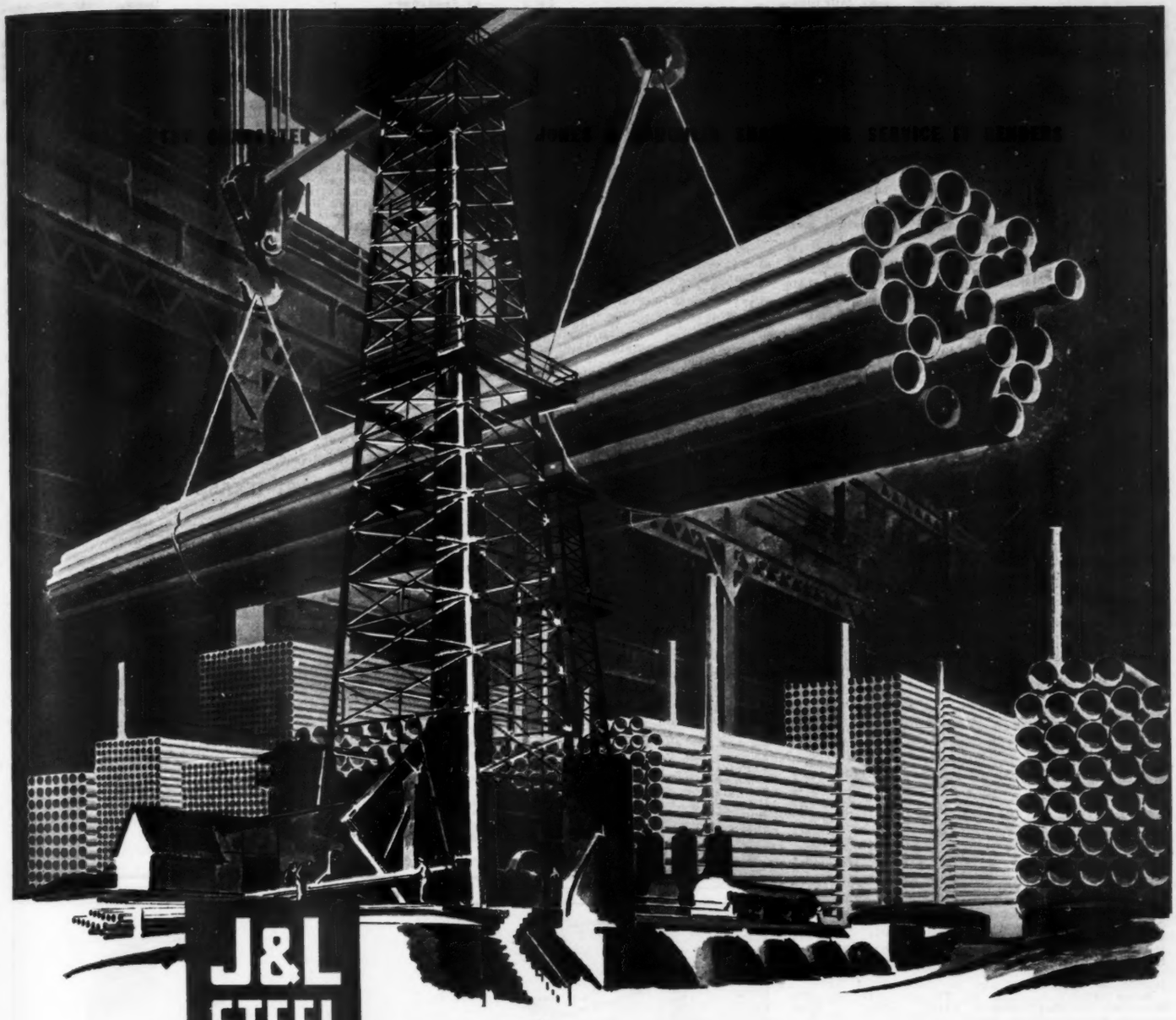

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* * *

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DRILL PIPE · CASING · TUBING · LINE PIPE

J&L PIPE

Company and location—	Daily capacity	Av. daily runs Nov.	Oct.
Paramount Ref. Co., Oklahoma City	2,000	700	700
Peppers Gasoline Co., Oklahoma City	500	200	200
Phillips Pet. Co., Okmulgee	6,000	4,650	4,510
Pure Oil Co., Muskogee	10,000	9,200	7,700
Rock Island Ref. Co., Beckett	6,000	3,100	3,000
Sinclair Ref. Co., Sand Springs	5,000	3,200	3,200
Sinclair Ref. Co., West Tulsa	6,000	(*)	(*)
Sooner State Ref. Co., Oklahoma City	705	400	400
Sun Oil Co., Yale	5,000	2,000	2,100
Sunray Oil Co., Allen	7,000	2,650	2,580
Texas Co., West Tulsa	15,000	12,000	12,000
Tide Water Oil Co., Drumright	15,000	11,500	12,500
Triangle Prod. & Ref. Co., Okahoma City	1,500	1,200	1,200
Wilcox Oil & Gas Co., Bristow	5,000	2,500	2,420
Wirt Franklin Pet. Corp., Ardmore	4,000	(*)	(*)
Yale Oil Corp., Yale	2,000	(*)	(*)
Total	295,400	152,370	149,310

*Shut down.

NORTH LOUISIANA

Company and location—	Daily capacity	Av. daily runs Nov.	Oct.
Acme Ref. Corp., Monroe	100	50	50
Bayou State Oil Corp., Houston	300	150	150
Griswold Ref. Co., Shreveport	2,500	1,500	1,500
Louisiana Oil Ref. Co., Shreveport, Bossier	23,000	18,000	19,000
Pelican Ref. Co., Converse	100	50	50
Shoreline Oil Co., Lewis	1,000	600	600
Spartan Ref. Co., Shreveport	12,000	(*)	(*)
Stanolind Oil & Gas Co., Vivian	3,500	2,000	2,000
Texas Co., Shreveport	7,000	(*)	(*)
Total	50,000	22,350	23,350

*Shut down.

EAST TEXAS

Company and location—	Daily capacity	Av. daily runs Nov.	Oct.
Acme Ref. Co., Gladewater	1,250	140	335
Adams Ref. Co., Big Sandy	1,000	(*)	(*)
Admiral Ref. Co., Kilgore	2,500	(*)	1,260
Artex Ref. Co., Arp	2,000	(*)	(*)
Bartlett Ref. Co., Kilgore	2,500	(*)	(*)
Beacon Oil & Ref. Co., Henderson	4,000	230	245
Blue Diamond Ref. Co., Gladewater	1,500	730	60
Bradley Ref. Co., Kilgore	2,000	(*)	(*)
Cascade Ref. Co., Reeds Switch	3,000	2,000	2,790
Century Ref. Co., Friars Switch	2,500	1,850	2,330
Chief Ref. Co., Gladewater	2,000	1,050	1,500
Condor Ref. Co., Kilgore	2,000	(*)	600
Danciger Refineries, Inc., Longview	10,000	(*)	(*)
Deason Ref. Co., Turnerstown	500	(*)	(*)
Dominant Ref. Co., Kilgore	4,000	2,000	3,820
East Texas Cracking Co., Camp Switch	4,200	160	610
East Texas Ref. Co., No. 2, Longview	10,000	6,500	5,890
East Texas Ref. Co., No. 3, Friars Switch	12,000	(*)	(*)
Friar Topping & Ref. Co., Friars Switch	2,000	(*)	(*)
Gilliland Ref. Co., Gladewater	4,000	3,200	3,960
Gilliland Ref. Co., Overton	5,500	2,800	3,330
Gilmer Ref. Co., Gladewater	1,000	(*)	(*)
Godlin Ref. Co., Gladewater	500	(*)	(*)
Heath Ref. Co., Camp Switch	1,000	(*)	315
Holmes Ref. Co., Gladewater	1,500	220	590
Hub Oil Ref. Co., Reeds Switch	3,000	(*)	(*)
Hunter & Knox Ref. Co., Reeds Switch	750	(*)	(*)
Hurricane Pet. Corp., Overton	4,500	3,600	2,215
Johnson Ref. Co., No. 1, Kilgore	1,200	390	(*)
M. S. Johnson Ref. Co., Gladewater	1,250	(*)	80
Keystone Ref. Co., Gladewater	1,000	520	(*)
Kilgore Reclamation Co., Kilgore	2,000	(*)	(*)
Lake Ref. Co., Gladewater	2,000	(*)	(*)
La Petite Ref. Co., Joinerville	500	(*)	50
Lagren Ref. Co., Kilgore	2,500	1,250	1,900
Lone Star Ref. Co., Gladewater	4,000	2,500	3,870
London Topping & Ref. Co., Overton	1,000	(*)	(*)
Longregg Ref. Co., Kilgore	500	(*)	(*)
Lotus Ref. Co., Gladewater	1,750	50	(*)
Master Pet. Co., Waco	1,000	300	300
Matthews Ref. Co., Gladewater	1,000	900	460
McKain Ref. Co., Gladewater	1,500	(*)	(*)
McMurray Ref. Co., Arp	4,000	2,640	2,450
Magnolia Pet. Co., Corsicana	5,000	4,200	4,100
National Ref. Co., Camp Switch	1,000	(*)	(*)
North Texas Ref. Co., Gladewater	1,500	630	670
Ocean Ref. Co., Kilgore	2,300	830	1,300
Outdoor Ref. Co., Kilgore	900	(*)	(*)
Overton Ref. Co., Overton	3,000	(*)	(*)
Ozaso Ref. Co., Friar Switch	1,200	240	1,020
Panama Ref. Co., Kilgore	3,000	1,840	(*)
Pelican Ref. Co., Gladewater	750	(*)	(*)
Pelican Ref. Co., Gladewater	1,000	(*)	(*)
Pennant Ref. Co., Kilgore	500	(*)	(*)
Pope Ref. Co., Gladewater	1,500	600	(*)
Premier Ref. Co., Greggton	4,000	1,900	2,900
Shoreline Ref. Co., Kilgore	4,000	(*)	(*)
Simms Co., West Dallas	4,000	(*)	(*)
Sinclair Ref. Co., Camp Switch	5,000	2,000	2,000
Solvex Refineries, Inc., Gladewater Tex.	7,500	(†)	(†)
Southern Oil Ref. Co., Reeds	3,000	(*)	(*)
Southport Ref. Co., Kilgore	5,000	2,200	3,000
Stag Ref. Co., Kilgore	1,200	(*)	(*)
Supreme Ref. Co., Gladewater	1,200	(*)	(*)
Swastika Ref. Co., Kilgore	3,000	1,050	750
Texas Co., Dallas	16,000	16,000	16,000
Texas Oil Products Co., Gladewater	3,000	2,400	2,900
Texanna Ref. Co., Kilgore	300	(*)	(*)
Texas State Ref. Co., Kilgore	1,000	(*)	(*)
Texover Ref. Co., Overton	2,000	920	1,380
Thompson & Bridges Ref. Co., Gladewater	1,000	180	840
Trio Ref. Co., Arp	2,100	1,550	2,110
Tyler, Tex., Prod. & Ref. Co., Tyler	15,000	5,100	6,900
Tyreco Ref. Co., No. 1, Arp	2,500	2,300	2,500
Tyreco Ref. Co., No. 2, Overton	3,000	2,100	2,870
Union Ref. Co., Kilgore	3,000	(*)	(*)
Upshur Ref. Co., Gladewater	1,000	(*)	(*)
Utah Ref. Co., Kilgore	3,000	1,900	2,670
Wichita Ref. Co., Gladewater	1,000	(*)	(*)
Wilemon Ref. Co., Overton	500	(*)	(*)
Witeners Ref. Co., Gladewater	1,500	(*)	(*)
Wolfe Ref. Co., Kilgore	1,000	(*)	(*)
Total	229,650	76,070	85,970

*Shut down. †Constructing.

NORTH CENTRAL TEXAS

Company and location—	Daily capacity	Av. daily runs Nov.	Oct.
Allstate Ref. Co., Thrall	2,500	(*)	(*)
Baird Ref. Co., Baird	1,500	1,300	1,300
Canyon Oil & Gas Co., Inc., Cisco	500	(*)	(*)
Continental Oil Co., Wichita Falls	6,000	2,800	4,000
Empire Oil & Refining Co., Gainesville	5,000	(*)	(*)
Exchange Pet. Corp., Albany	1,200	350	250
Falls Ref. Co., Wichita Falls	2,000	300	300
Gratex Ref. & Fuel Oil Co., Graham	500	275	280
Gulf Ref. Co., Fort Worth	10,000	4,000	3,480
Gulf Ref. Co., Sweetwater	7,500	6,500	4,330
Haskell Oil Ref. Co., Breckenridge	200	(*)	(*)
Hightower Oil & Ref. Co., Brownwood	750	300	300
Hill Ref. Co., Ballinger	80	50	50
Imperial Gas Corp., Fort Worth	1,200	300	(*)
Jacksboro Ref. Co., Jacksboro	50	50	50
LaSalle Pet. Co., Burkburnett	3,500	700	700
Magnolia Pet. Co., Fort Worth, No. 1	12,000	5,200	4,700
Marathon Oil Co., Fort Worth	5,000	3,660	3,550
Master Pet. Co., Hawley	800	500	500
Moutray Ref. Co., Hawley	600	500	400
Muenster Ref. Co., Abilene	300	(*)	(*)
New Deal Ref. Co., Abilene	300	(*)	(*)
Nolting Ref. Co., Sweetwater	1,000	(*)	(*)
Norgold Ref. Co., West Olney	400	200	200
Olney Oil & Ref. Co., North Olney	3,000	1,600	1,700
Omega Ref. Co., Brownwood	200	(*)	(*)
Panhandle Ref. Co., Wichita Falls	5,000	2,500	2,500
Panhandle Ref. Co., Leuders	1,200	700	700
Pilot Point Ref. Co., Pilot Point	500	100	100
Sinclair Ref. Co., Fort Worth	5,000	2,500	2,500
Southtex Ref. Co., Trent	250	(*)	(*)
Southland Ref. Co., Megargel	500	200	200
Southland Ref. Co., Olney	1,000	(*)	(*)
Starlight Ref. Co., Inc., Ballinger	500	350	350
Superior Ref. Co., Tiffin	800	(*)	(*)
Taylor Ref. Co., Taylor	6,000	800	800
Taxman Ref. Co., Wichita Falls	3,500	1,750	2,000
Texas Pacific Coal & Oil Co., Fort Worth	3,000	(*)	(*)
Texas Pacific Coal & Oil Co., Caddo	1,000	700	700
Tucker Ref. Co., Wichita Falls	200	150	150
Waggoner Ref. Co., Electra	6,000	2,500	2,500
Watt Ref. Co., Brownwood	200	200	200
Total	100,730	41,185	38,940

*Shut down.

SOUTHWEST TEXAS

Company and location—	Daily capacity	Av. daily runs Nov.	Oct.
Amsco Ref. Co., Mirando City	4,000	2,700	2,000
Bennett Ref. Co., San Antonio	500	500	500
Bennett Ref. Co., Bruni	900	600	600
Capitol Ref. Co., Luling	2,500	(*)	(*)
Chapa Ref. Co., Laredo	100	(*)	(*)
Citizens Ref. Co., Luling	200	50	50
Corpus Chrisiti Ref. Co., Corpus Christi	3,000	1,400	1,500
Humble Oil & Ref. Co., Ingleside	15,000	10,000	10,000
Humble Oil & Ref. Co., San Antonio	5,000	3,000	3,050
Magnolia Pet. Co., Luling	7,000	4,100	4,090
Midway Oil & Ref. Co., Pettus	1,000	500	500
Pettus Ref. Co., Pettus	1,500	1,200	1,200
Pettus Ref. Co., Mathis	1,000	700	(*)
Pioneer Oil & Ref. Co., Somerset	2,000	1,500	1,000
Rado Ref. & Prod. Co., McAllen	500	250	200
Texas Co., San Antonio	3,000	3,000	3,000
Texas Pet. Prod. Co., Somerset	1,500	250	250
Valley Ref. Co., Harlington	1,000	800	800
Total	49,700	29,350	28,740

*Shut down.

WEST TEXAS AND PANHANDLE

Company and location—	Daily capacity	Av. daily runs Nov.	Oct.
Active Oil Co., Arno	1,500	(*)	(*)
Aero Ref. Co., Pecos	220	100	100
Coltex Ref. Co., Colorado	12,500	8,000	8,000
Concho Ref. Co., San Angelo	250	100	100
Cosden Oil Co., Big Spring	12,500	8,000	9,000
Danciger Refs., Inc., Pampa	6,500	5,500	5,500
Gibson Oil Corp., Magic City	250	(*)	(*)
Howard County Ref. Co., Big Spring	2,500	300	300
Mertzon Ref. Co., Mertzon	100	50	50
McNutt Ref. Co., El Paso	2,000	750	750
Panhandle Ref. Co., Kings Mill	2,000	1,000	1,000
Paramount Pet. Co., San Angelo	2,000	(*)	(*)
Phillips Pet. Co., Borger	50,000	23,330	19,100
Shamrock Oil & Gas Co., Sunray	2,000	1,400	1,300
Shamrock Oil & Gas Co., Meldavis	1,500	1,600	1,500
Sinclair Ref. Co., El Paso	2,500	(*)	(*)
Standard Oil Co. of Texas, El Paso	14,000	5,000	5,200
Texas Co., El Paso	2,000	1,000	1,000
Texas Co., Amarillo	4,000	3,000	3,000
West Texas Ref. Co., Pecos City	6,000	(*)	(*)
Wickett Pet. Co., Wickett	2,500	600	600
Total	126,820	59,730	56,400

*Shut down.

President Charles F. Roeser presenting a testimonal from the Independent Petroleum Association of America to Wirt Franklin, retiring president of the organization

Oil Reserves Automatically Converted Into Working Stocks Are Problem

By WALLACE E. PRATT
Vice President, Humble Oil & Refining Co.*

In a very real sense, reserves of petroleum have converted themselves automatically upon discovery into petroleum stocks. It is desirable, even imperative, that the industry have adequate known reserves sufficient for the anticipated needs over the next decade or next generation, but it is crushing—fatal—to the industry to carry in stock sufficient oil to meet the probable demand for 10 years to come. The expense of drilling the wells, producing the oil, and storing the excess, becomes literally intolerable.

The degree to which oil reserves, under the conditions which have prevailed in the past, became indistinguishable from the actual working stocks of the industry, requires emphasis. If has not been generally comprehended even by leaders within the industry. If oil, once found, must be produced, the expense of carrying a barrel of oil in reserve tends to become the expense of carrying a barrel of oil in stock. It is essential that known reserves be adequate for future consumption over many years, but no industry can survive if it carries as working stocks the product it hopes to sell 10 or 25 years hence.

This, then, is the oil producer's dilemma. If he is to function properly in the national economy, he must build up proven reserves of oil sufficient to meet future requirements for tens of years to come. Failing this, he betrays his trust. But if he does build up adequate reserves, by that very act he creates a crushing burden of stocks beneath which he perishes. In either case, whichever alternative he chooses, his cause is lost.

Basis of Compact

In the control of production through the police power of the several states, contemplated under the Interstate Compact plan, reliance is placed principally on the power vested in the state conservation authorities to prevent physical waste of petroleum resources. This provision of the statutes of the oil-producing states, if strictly enforced, will bring about effective production control and will establish equity between competing producers by virtue of the fact that physical waste results whenever competing producers are not permitted to make ratable withdrawals from the common reservoir. Both production without control and disproportionate withdrawals from one property in a field as compared to another property dissipate the gas pressure which should serve each producer alike in expelling the oil from the sand into the wells, and in lifting the oil through the wells to the surface. These practices also promote premature and unequal advance of normal bottom- and edge-water which often traps off and prevents the recovery of oil that would be recovered if the encroachment of water were approximately retarded and controlled.

The states probably have the power also to control production where such control is necessary to protect the correlative rights of the several owners of property in a pool, independently of waste prevention. It is vital to a full understanding of the problem of controlling production by such a plan to visualize clearly the relationships between the control of production and physical waste, and between control of production and equity among adjoining owners or competitors in a single oil field.

The control of the aggregate quantity to be taken from any oil field involves two functions: (1) the control of the aggregate withdrawals, and the maintenance of ratable withdrawals from the several competing properties, both for the purpose of preventing physical waste; (2) the distribution of the allowable production among the several competing properties in an oil field on a reasonable, uniform, and equitable basis, in order to protect the property rights of the several owners and to give to each the opportunity to make efficient use of his fair share of the reservoir energy, and to recover his fair and equitable share of the oil in the natural reservoir. To accomplish these purposes it is necessary to limit the production from any field to the ascertained demand for the oil from that field and to an even lower limit if the demand exceeds the amount which can be produced without waste.

Practical Difficulties

Even if the Interstate Compact is perfected, much will remain to be done before control of production becomes satisfactorily effective. The desire for maximum immediate return from producing properties, and the failure to grasp all the implications and to understand all the benefits that would come to the industry at large with effective control, together with a natural reluctance to submit to any regulatory measures, inspire many operators to oppose every move toward the control of production. As an example of these practical difficulties there may be cited the widespread current practice of allocating allowable production to the individual wells in a controlled or prorated field on a basis of the relative capacity of each well to produce oil, regardless of the size of the property on which the well is drilled.

As a result of this practice, the owner of a well on a one-half acre tract is given an allowable equal to that of his neighbor who owns a single well of equal capacity to produce on an adjacent 10-acre tract. This creates an inequity in that it permits the owner of the smaller tract to draw oil from his neighbor's property. The neighbor's only recourse lies in drilling more wells on his tract. If he is to withdraw his oil at the same rate that the owner of the one-half acre tract does, he must complete 19 additional wells on his 10-acre tract. Only by so doing can the neighbor recover his fair share of oil from the common reservoir. But this leads to the drilling of 19 unnecessary wells on a single 10-acre tract.

This practice has forced the drilling of tens of thousands of unnecessary wells, the cost of which must in the final analysis be included in the price at which gasoline and other oil products are sold to the public. At the moment the practice is the cause of grievous dissension in the oil-producing industry. The alternative, fairer, and more intelligent course to follow is to allocate to each well of equal capacity an allowable proportionate to the area (within the boundaries of the property on which the well is located) which it may be expected to drain with efficiency. Such a method would obviate the necessity for drilling an excessive number of wells and would thereby lower the cost of petroleum products. It would also enable each owner to recover his fair share of the oil.

*Before Chamber of Commerce of United States, Southwestern Division, Kansas City, Mo., November 8.

Amos L. Beaty and Mrs. Beaty

Bureau of Mines September Report On Petroleum

Crude petroleum—The production of crude petroleum in September, 1935, totaled 84,109,000 bbls., a daily average of 2,803,600 bbls. This average represents the highest production rate for any month since June, 1933, being 67,600 bbls. above the average in August and 278,300 bbls. or 11 per cent higher than the average of September, 1934. California and most of the other producing states exceeded their "recommendations" in October; several including Oklahoma and Kansas stayed within their "quotas."

Daily average production in the East Texas field declined in September, but all the other major districts of Texas recorded increases and the average for the state rose to 1,068,800 bbls., compared with 1,059,600 bbls. in August. Daily average production in Oklahoma and Kansas showed little change, but Louisiana made another new record and California registered an increase.

Crude runs to stills kept pace with production and the withdrawal of from 100,000 to 150,000 bbls. daily from crude-oil stocks, which began some months ago, was continued in September. Total stocks of refinable crude on September 30 were 320,005,000 bbls., compared with 324,966,000 bbls. on hand August 31 and 349,407,000 bbls. on September 30, 1934.

Refined products—Increased crude runs, the seasonal decline in gasoline demand and increased demand for domestic heating oils, set the stage for a further reduction in the percentage yield of gasoline. The yield in September was 44.2 per cent, compared with 44.8 in August and 45.3 per cent in July.

The domestic demand for motor fuel in September failed to fulfill expectations by approximately the same amount that the demand in August exceeded them. The domestic demand was 37,862,000 bbls., or only about 3 or 4 per cent over the computed "normal" for a year ago. However, exports of motor fuel showed no signs of diminishing, in fact, the total for September was higher than in August and about 60 per cent above September, 1934. Stocks of finished and unfinished gasoline were not reduced as much as anticipated, the total on September 30 being 51,334,000 bbls. or only 366,000 bbls. lower than stocks at the close of August.

Magnetic Storm

Tucson, Ariz. observatory of the U. S. Coast and Geodetic Survey reports a moderate magnetic storm started at 10 a.m. (C.S.T.) on October 5 and ended at 4 a.m. (C.S.T.) October 6.

Telegrams follow:

"Storm began fifth. Sixteen. Moderate."

"Storm ended sixth. Ten."

Oil News from Foreign Lands

UNITED KINGDOM

High officials of the British government including Ramsay MacDonald, former premier, were present recently at the formal opening of the hydrogenation plant of the Imperial Chemical Industries located at Billingham, England. The plant which is said to have cost $15,000,000 has been operating on a part-time basis for several weeks. Ultimately it is to operate with coal, with motor fuels the principal product. It is expected that the plant with additions to be made later will supply approximately 5 per cent of the total domestic motor fuel requirements in Great Britain. The motor fuel output of the plant is exempt from the 8d. tax per gallon, tax paid by fuels obtained from petroleum.

The latest report of the Board of Trade covering imports of crude oil and refinery products into the United Kingdom indicate substantial gains in the total demand for petroleum products. In September the imports totaled 242,224,000 imperial gallons, a gain of 35,945,000 gallons, or 17.4 per cent over September, 1934. This is one of the largest gains ever shown and is further indication that the United Kingdom this year will establish a new yearly peak in consumption of petroleum products. The motor fuel imports in September while less than in August totaled 105,123,000 imperial gallons, a gain of 30 per cent over September, 1934. The report, however, points out that imports in September last year were below the average for the year.

The September report shows some differences in the trends from the accumulative totals which cover the entire nine months. Imports of kerosene which have been running far behind last year picked up with a 50 per cent gain over September, 1934. The imports of fuel oil, however, were less than a year ago although the nine months' totals show a gain over 1934.

For the first nine months of 1935 and 1934 the imports of crude oil and refinery products were as follows (imperial gallons):

	1935	1934	1935 pct. gain
Crude oil	286,669,000	276,859,000	2.6
Gasoline	976,246,000	847,149,000	15 2
Kerosene	133,929,000	155,758,000	*14 0
Lubricating oil	74,502,000	80,569,000	*7.5
Gas oil	79,487,000	101,986,000	*22.0
Fuel oil	502,908,000	472,709,000	6 6
Miscellaneous oil	12,059,000	16,073,000	*24 9
Total	2,166,801,000	2,051,103,000	5 6
Daily average†	226,776	214,662	

*Decrease. †Barrels.

This table shows that all the increases in imports this year have been in crude oil, gasoline and fuel oil with losses in other products. This does not necessarily mean a decrease in the consumption due to the fact that production of these products at local refineries may be increasing. It is known that the lubricating oil output of refineries in the United Kingdom has increased with additional output assured for the coming year.

The large gain in gasoline imports is said to be due in part to purchases made for the aviation corp. The regular domestic consumption of motor fuels in the United Kingdom has shown a consistent gain this year over last year due to the increased use of practically all types of motor vehicles.

There was little change in relative position of countries supplying the imports. Iraq was first in the case of crude oil with shipments totaling 8,367,000 imperial gallons followed by Mexico with 8,048,000 gallons and Peru, replacing Iran, in third position with 6,748,000 gallons. Netherlands West Indies refiners continue to enjoy a large increase in gasoline sales, the total of 45,412,000 gallons in September representing better than 40 per cent of the total.

Imports of kerosene from the United States increased and in September the total was 5,580,000 gallons which is about 50 per cent of the total for the first nine months coming from that country. For the first nine months, kerosene shipments to the United Kingdom from the United States decreased approximately 80 per cent. Kerosene imports from Iran and Rumania have decreased in recent months.

In lubricating oil imports, the United States continues to lead all countries but in September they were 50 per cent less than in September, 1934. The bulk of the fuel oil imports also come from Netherlands East Indies with total shipments of 31,111,000 imperial gallons in September. The per unit value of all imports is slightly greater than last year.

ITALY

Crude oil imports into Italy the first six months of this year increased only 13 per cent over the same period last year despite reports during that period that she was buying large supplies in preparation for war. The imports based on data obtained by the U. S. Department of Interior for the first six months of 1935 and 1934 were as follows (data in barrels):

	1935	1934
Crude petroleum	775,000	518,000
Gasoline	1,503,000	1,239,000
Kerosene	446,000	409,000
Lub oils	264,000	207,000
Fuel oils	4,081,000	3,840,000
Wax (pounds)	37,400,000	31,613,000

The imports exclusive of wax totaled 7,063,000 bbls. the first half of 1935 and 6,213,000 bbls. for the same period in 1933. Based on daily averages, this amounts to 39,000 bbls. in 1935 and 34,300 bbls. in 1934.

Rumania obtained the largest part of the 1935 imports with a total of 2,866,000 bbls. followed by U.S.S.R. with 1,130,000 bbls.; Iran (Persia), 1,130,000 bbls.; United States, 448,000 bbls.; Colombia, 448,000 tons; and Iraq, 190,000 tons. Several other countries shared in the remainder of the business.

VENEZUELA

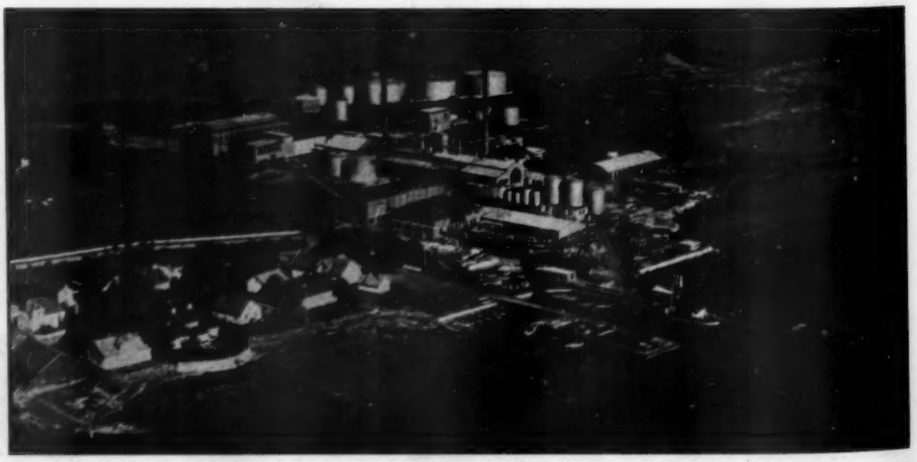
Crude oil production in Venezuela during October averaged 426,020 barrels daily, the largest daily output for any month this year. The largest previous production was in June when the daily average was 424,411 bbls. The October output was 8 per cent larger than October, 1934, and 22.8 per cent larger than the production in October, 1933.

CRUDE OIL PRODUCTION IN VENEZUELA IN OCTOBER BY FIELDS AND COMPANIES

By fields:	1935	1934
Lagunillas	7,410,247	6,785,550
La Rosa-Ambrosia	1,915,307	1,855,940
Quiriquire	1,755,814	1,188,300
Mene Grande	1,310,184	1,442,140
Tarra	422,902	421,940
Cumarebo	190,565	306,600
El Mene	68,340	80,600
La Paz	14,043	19,700
Total	13,206,632	12,240,300
By companies:	1935	1934
Lago Petroleum Corp.	4,103,805	4,418,350
Venezuelan Oil Concessions Ltd.	3,395,240	3,045,250
Creole Petroleum Corp.	2,447,161	1,691,700
Venezuelan Gulf Oil Co.	1,459,000	1,139,000
Caribbean Petroleum Co. Ltd.	1,310,184	1,442,100
Colon Oil Corp.	422,902	421,900
British Controlled Oilfields Ltd.	68,340	80,500
Total	13,206,632	12,240,300
Daily averages:	1935	1934
October	426,020	394,850
September	422,114	402,543
August	414,700	394,620
July	415,582	386,342
June	424,411	373,435
May	401,742	372,333
April	382,378	367,333
March	371,900	351,630
February	396,020	348,900
January	405,156	350,270
First 6 months	397,055	360,780

The daily average production of most fields in October was practically the same as in September except Lagunillas and Quiriquire which reported small increases. Part of the increased production in Lagunillas this year is accounted for by the enlarged output of old wells made possible by the installation of new pumping units. The Venezuelan Oil Co. whose production is showing 25 per cent increase over last year is completing a program in which approximately 70 pumping units have been installed at its wells in Lagunillas with a few in the La Rosa field.

No special developments are reported from any of the wildcat tests that are being drilled in Venezuela. The test of the Standard Oil Co. of Venezuela (Creole) known as El Lirial in eastern Venezuela according to latest reports is drilling 1,100 feet. This is the first test to be drilled on the acreage of the Pantepec interests. The Santa Rosa test of the Venezuelan Gulf Oil Co. located north of the Oficina field in eastern Venezuela is drilling at 5,900 feet. Other wildcat tests include Berjadin No. 3 drilling at 5,460 feet and San Patricio No. 1 drilling at 5,660 feet. These tests are being drilled by the Standard of Venezuela.



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Too Many Ifs

Vigorous plain-speaking characterized the address of President Axtell J. Byles before the American Petroleum Institute at Los Angeles. The paramount question, he declared, is whether the oil industry is to remain a competitive private industry serving the public or whether we are to have a socialized industry to serve the political bread line.

He is not impressed by the change from the raucous threats of the former petroleum administrator to the dulcet dubiety of the White House statement of last week. There were too many ifs in it.

It prescribes a program of perfection for the industry as a prerequisite to being allowed to run its own affairs. If it fails in this, or if it fails in that, the alternative is to be federal control. There is more of a threat than a promise in the presidential announcement.

The threat is sugar-coated with an if, the promise conditioned upon a perfection assumed to be unattainable. The inference is that the industry cannot meet the requirements and is therefore sentenced in advance.

On the other hand, Mr. Byles observes that the industry is made up of human beings. Neither it, nor any of them, are perfect. Yet measured in terms of national service in good times and in bad, it need have no embarrassment in a comparison of its record of service to the public with that of any group or industry or the government itself.

It is one industry, he emphasized, that during the depression has not been a suppliant for federal relief, but, on the contrary, has contributed over a billion dollars in taxes. It increased employment 37 per cent from the low point while shortening hours 30 per cent and raising wages which are at practically the 1929 peak.

All this, too, with an uninterrupted service to the public of continually improved products at a cost consistently less than that of all commodities.

Here is an industry that has been faithful to the public, fair to its employes, that has done more for conservation than all the conservation agencies by getting twice as much gasoline from a barrel of crude, and that has been one of the heaviest taxpayers in the country, yet is being singled out for federal control. Why?

Is it because the experience of the federal oil administration has whetted the appetites of the place hunters by suggesting that the nation-wide ramifications of the oil industry offered opportunity for a veritable army of federal job holders?

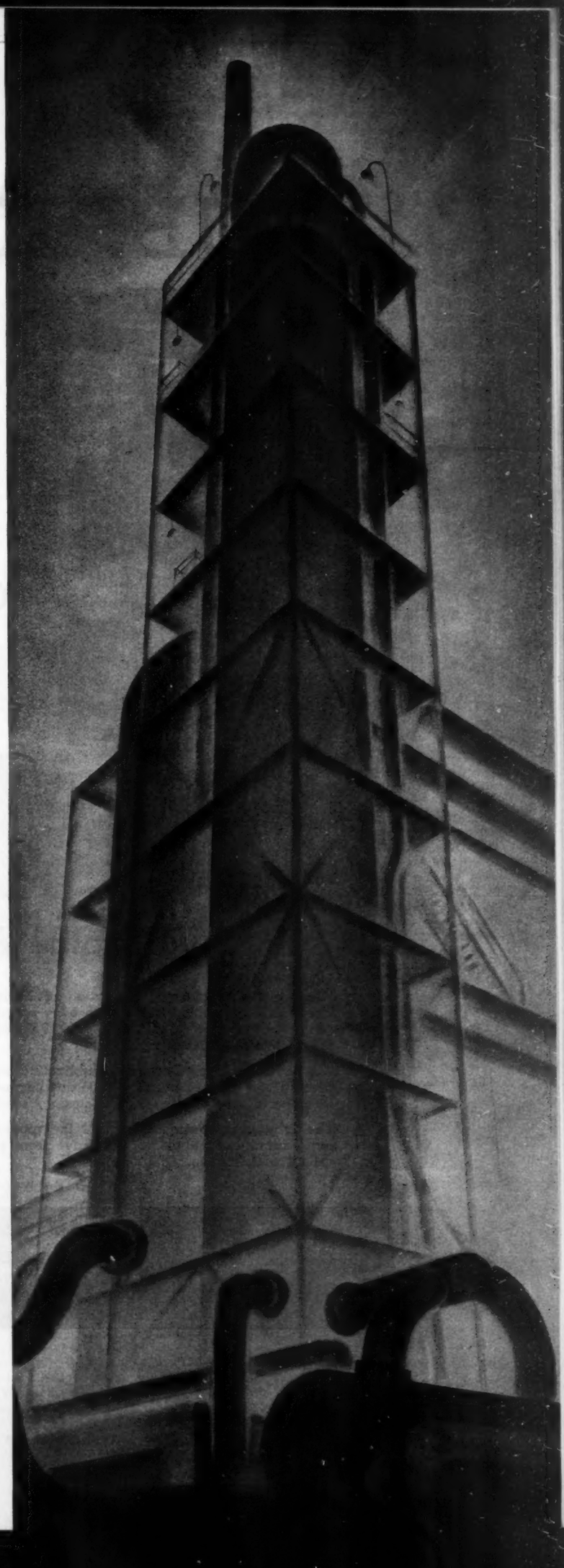
The oil industry has already shown that its business was so efficiently conducted that it could sell its product at a price so reasonable that both the state and federal governments could add as much more in sales taxes without provoking popular revolt.

Perhaps it is thought the industry could stand the added burden of a political bread line.

That, however, would not be all. The real danger would be the paralyzing effects of governmental methods in demoralizing the initiative and enterprise of the industry. If the oil industry, or any other business, falls under the sway of a bunch of clock watchers whose jobs are assured without effort, the incentive which has impelled the wildcatter, the technologist and the investor to bring the oil industry to its present efficiency, and provide for future reserves, will be gone.

The oil industry is immediately threatened, but bills pending before congress indicate that the socialization of the oil business would be only a beginning. A federal licensing system for all business engaged in interstate commerce would usurp the rights of both the states and the individual, transferring supreme authority to a political commission at Washington.

The petroleum code was but an experimental sample of what socialistic bureaucracy could do.



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Construction Work on Crude Oil Line Into Russell County Is Moving Fast

By HAROLD K. IHRIG

Construction work is progressing rapidly on the new 8-inch oil line being built from the Hollow pool in Harvey County, Kansas, toward its terminus in the Gorham pool in western Russell County. This line is being built by two pipe line companies. The White Eagle Division of Socony-Vacuum Corp. is laying the 38-mile section from the Hollow pool to the vicinity of the Chase pool where they are building a receiving

Fig. 1—Ditcher along the Kaw section of the new pipe line to serve western Kansas

and boosting station to handle oil to be supplied by the section of the line to be built by the Kaw Pipe Line Co. from this station to the Gorham pool. The Kaw Pipe Line Co. was formed by the Phillips Petroleum Co., The Texas Co., and the Empire Gas & Fuel Co.

The pipe being used in the White Eagle section is all new 40-foot random length joint pipe, four different makes being represented. There is approximately 50,000 feet each of National Seamless, Jones & Laughlin seamless, Republic Electric Welded, and A. O. Smith Corp. welded pipe. The Kaw Pipe Line section of the line is to be composed of pipe salvaged from lines being abandoned in the southern part of Oklahoma and the northern part of Texas. This pipe, being old, is considerably shorter than the pipe being used by the White Eagle. Construction work has been delayed considerably on the Kaw section of the line because of lack of pipe with which to work.

Fig. 3—Tractor equipped with booms carrying a wrapped section of pipe

The pipe is being transported from the southern part of Oklahoma by truck as it is removed from service at that point.

Due to the level topography, soil conditions and good roads construction work is made easier than that often experienced in other localities. Figure 1 shows a ditching machine working along the Kaw Pipe Line section of the line. At the time this picture was taken this machine was cutting about 600 feet of ditch an hour. The trench is 38 inches deep, and in this particular section is in a sandy clay soil which made ditch walls that stood up in good shape.

All welding is done by the acetylene method. Number 24 Oxweld rods are being used. It was noted that after each weld the welder stenciled the ends of the two joints just connected with a steel stencil so that in case the weld ever failed it might be easily identified, as each welder has his individual stencil. Figure 2 shows a weld being completed. All welding is done with the multi-flame torches as shown.

Pipe is being coated and wrapped through such "hot-spots" as were determined by a survey conducted after the location survey and prior to the stringing of the pipe. Pipe outside of these "hot-

Fig. 2—Multi-flame torch

spots" is receiving no protection other than that given at the factory. Figure 3 shows tractors equipped with booms carrying a wrapped section of the line into position for welding.

The firing line on the White Eagle section of the line is now within 15 miles of the station under construction near the Chase pool. Ditching, final welding, placing and back-filling operations are in progress some distance behind the main firing line. Truman & Smith, of Eldorado, Kans., are contractors on this section of the line.

White Eagle Station

The station under construction by White Eagle will consist of three steel working and storage tanks. One of these tanks is to be a new 10,000-bbl. all-welded tank and is now being erected by the Chicago Bridge & Iron Works. The other two tanks are to be riveted tanks with capacities of 37,000 bbls. each. These two tanks are salvaged tanks, having been in service at other points previously. Figure 4 shows tank building crews assembling a bottom of one of the 37,000 bbl. tanks, with the 10,000-bbl. tank being erected in the background. All three tanks will be equipped with Wiggins Floating Roofs. The pump to be installed in this station is a 6-inch by 24-inch Worthington Triplex pipe line pump to be direct connected to a 400-horse power De La Vergne diesel engine. This unit will have a daily capacity of approximately 26,000 bbls. per day at 700 pounds per square inch pressure. Figure 5 is a view of the station site showing forms about the 250 cubic yard engine and pump block, with the office and garage in the background.

At the Kaw Pipe Line end of the line in the Gorham pool in Russell County it is not expected to construct a gathering or boosting station but to

Fig. 4—Tank building crew assembling the bottom plates for a 37,000-bbl. tank

rely on rather large field pumping units that will pick up oil from the gathering systems and pump it directly into the main line and to the White Eagle station near the Chase pool.

The progress made on the construction of this line is being watched with a great deal of interest not only from operators in the Russell County area but from drilling contractors, lease owners, equipment manufacturers and royalty dealers. Considering the fact that there are about 20 pools in and surrounding Russell County that at the present time either have no outlet or are forced to shut in because of the inability of the existing connections to take more than a very small part of the potential production, this line now being built is due to start a great deal of operations that have been shut down or held back because of the pipe line condition.

The White Eagle section of the line is expected to reach completion by the first of the coming year, but a completion date on the Kaw

Fig. 5—Station site and headquarters for construction materials

Pipe Line section would fall after the first of the year, probably in February.

In addition to the main line an extensive system of gathering lines is being constructed in Ellis, Russell, Rush, Barton and Ellsworth counties, to serve producers there.

Sucker Rod Pumps Maintain Important Place in Oklahoma City Operations

By PAUL REED

Deep well pumping, such as that practiced in the Oklahoma City field, has occasioned many operators to give attention to equipment other than the conventional sucker rod type. Immersed pumps and various gas and air lifting devices have been used. While the experiments continue, certain sucker rod pumps hold their own.

At the present stage in the pumping of the Oklahoma City Field, an inquiry into the kinds of sucker rod pumps in operation reveals what types have been able to survive, so far, in the pumping of such a field at 6,300-6,500 feet. For three years beam wells have been a common sight in the south end; in recent months they have been increasing to the north.

When the Oklahoma City Pool started to go on the pump, experience previously gained in the Seminole Field was naturally drawn upon. Yet, out of the wide assortment of sucker rod pumps handling various conditions at Seminole, only two kinds have proved popular at Oklahoma City. These two are the multiple tube and the steel plunger pumps.

At Seminole, pumps in service range all the way from the common working barrel (used in a few water wells) and other cup pumps of different types, such as liner pumps, liner insert and inverted, with variations in plungers such as repack and combination, composite pumps (sometimes designated as traveling type composite plunger pumps, sectional plunger traveling tube pumps, and groove seal rod cold drawn traveling pumps)—also variations like turbulent seal pumps—multiple tube pumps, as well as steel plunger pumps of types like the insert and the inverted and the so-called Parker type.

Not only is there a wider variety of pumps used at Seminole, but it is also noticed that the kinds of pumps most extensively used at Seminole are hardly to be found at all at Oklahoma City. In a rough generalization it can be said that Parker-type steel plunger pumps and inverted pumps of different types, taken together, would make up a majority of the pumps used at Seminole. At Oklahoma City the number of inverted pumps, if any, is negligible; the few Parker-type pumps are found in wells where the fluid level is unusually high.

The greater depth at Oklahoma City—a field too deep to tell when the pump is pounding fluid—accentuated the stretch in the rods so that certain results were sometimes produced which were contradictory to what had been experienced in pumping from lesser depths. Among these results were: finding sometimes that plunger travel was longer than polish rod travel, due to overreaching of the rods; and discovering that by using a smaller bore you could sometimes increase the efficiency of your pump.

In reviewing the course of their pumping procedure certain operators have pointed out that because of the very obvious necessity of handling a lot of floating sand, they were inclined to allow the floating sand to obscure to some degree the pumping problems, which were really due to the greater depth. Because of this, they were inclined to select a pump with special regard for its apparent ability to handle sand readily. Later there was inaugurated what has become very nearly a general policy of cleaning out before putting a well on the pump. This has not been a general policy at Seminole. And as time went on, more attention was given to the selection of pumps with regard to the design, size of bore, fit and metals adapted to lifting the production from this depth with the least attention to pump upkeep.

Cup plunger pumps could not function at this depth because the weight of the fluid pressed down the cups so that they acted like brakes. Furthermore, prohibitive wear from sand is also reported. In spite of this, makers of cup pumps are planning to stage a comeback in this field later on.

Up to the time that Oklahoma City went on the pump, there had been an assumption that the bigger the bore the more you could be certain to pump. In 1928 this was given a jolt by some tests carried on in California and even though the demonstration was repeated at Seminole shortly before pumping commenced at Oklahoma City, the significance of these findings was not appreciated and some of the first wells to go on the pump at Oklahoma City had 2¼-inch bores for steel plunger pumps. Today, the only steel plunger bores of this size are to be found on Parker-type pumps where the fluid level is unusually high. Most plunger pumps in the field have bores of 1¼, 1½ and 1¾ inches. Tubing is mostly 2½-inch upset; there is some 2-inch tubing in the field.

An illustration of how the steel plunger pump with a bore of 1¾ inches will pump more than one with a large bore—owing to the longer plunger travel for the smaller pump due to less stretch in the rods because of less fluid load on the pump—is presented by a comparative test made on a lease in the Oklahoma City Field. A 2¾-inch cup pump had just succeeded in raising the fluid to the surface with a negligible output. A 2¾-inch steel plunger pumped 200 bbls. a day. A 1¾-inch steel insert plunger, with a —.002-inch fit, pumped about 600 bbls. a day. If the maximum output had been less than 200 bbls., a 1¼-inch pump of this same make would have been used, because though capacity of the pump would have been reduced by this reduction of bore, the total daily production would have been increased by following the familiar practice of keeping the oil off the sand by pumping a longer time. On a few wells which have been continually overpumped, it has paid to pump very slowly. One example of this is a well which was finally brought to produce profitably at the rate of 30 bbls. a day with 12 strokes per minute, 48-inch strokes. When pumped hard it made 100 bbls. a day, but in four days it would sand up.

Since the sucker rod pumps at Oklahoma City belong to two types designed according to diametrically opposite theories, comparative results in lifting oil over a period of time will be interesting to watch. One type, the multiple tube pump, is made by one manufacturer only. The other, the steel plunger pump, comes in several makes which are similar in design and differ in regard to metals and theories of how close they should fit.

The multiple tube pump consists of a stationary tube and two traveling tubes—one traveling tube reciprocating on the inside and the other on the outside of the stationary tube. Fits are between .020 inch and .060 inch—a tolerance about the diameter of a grain of sand. And since the relatively loose-fitting construction is inherent in the design, this pump is opposed in principle to all tight fit pumps. It is claimed that the loose fit reduces rod breakage and facilitates the handling of sand.

Drops and seats are preferred to balls and seats by the manufacturer of this pump because of their quicker action. Only for exceptional cases are balls and seats recommended for this pump.

Multiple tube pumps used in the Oklahoma City Field are priced at $150. Prices for steel plunger pumps run from $198 to $300.

Most of the steel plunger pumps in this field are of the traveling plunger liner insert type. This type of pump is run on the rods complete—plunger, liner, standing valve and all—and is anchored in a shoe at the bottom of the shell at the end of the tubing. Both the multiple tube and the insert pump can be retrieved without pulling the tubing. The so-called Parker-type pump, already referred to, is sometimes designated as "top-collar-both-ends." This pump has the liner and the standing valve in a jacket that screws on the end of the tubing. The bore of this pump can be larger than that of the insert pump for the same size of tubing and in this field it is sometimes favored for wells where the fluid level is unusually high. The price of this type is about a third less than that of the liner insert.

During the early days of pumping at Oklahoma City a few inverted pumps were tried out.

Even though, as a class, steel plunger pumps are comparatively tight, the difference in opinion as to how tight they should be is found to be lined up as follows: One manufacturer who has promoted the use of hard

Running rods in the Oklahoma City Field

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steel liners and plungers will make these with a fit as close as .002 inch but recommends .005 inch. Another manufacturer making a pump, practically identical in design, uses molybdenum alloy liners and chromium-plated plungers and advocates the tight fit of .002 inch (the size of a hair) for all insert pumps. And because of the importance of accuracy in such tight-fit pumps, this company has emphasized the importance of taking measurements with dial gauges and of using the most exact machine shop methods in reconditioning used pumps.

Pulling tubing at Oklahoma City is considered to be a 24-hour job, costing between $70 and $90; in cases where portable equipment is used costs are more.

General conclusions regarding lifting costs cannot be arrived at due to the difference in the history of the wells and the methods of keeping accounts. Costs for pumping equipment, including rig front, power, rods, tubing, pump, etc., are between $10,000 and $15,000; in most instances they are between $11,000 and $12,000. In several studies to determine lifting costs in this field, charges for depreciation and interest have varied between $10 and $13 per day per well. On certain properties scattered through the field, with wells making between 70 and 200 bbls. per day, wells in the Wilcox were estimated to have a daily expense for operating items, averaged over several months, between $6 and $12 per day per well (in parts of the field where the fluid level is higher); where the fluid level is low this was $9 to $18 per day per well. A number of operators have expressed the opinion that when lifting costs are taken together with other items which comprise production costs, an income of $40 a day per well must be produced to break even. Considering the royalty, a 50-bbl. well is barely making a profit. Still there are a number of wells making less than half this amount, where it is claimed that the operation is made to pay by keeping pulling and maintenance expense down by light pumping.

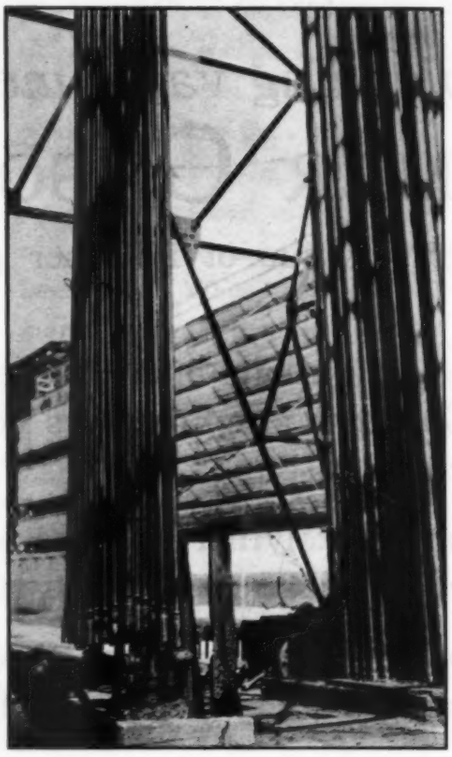
Cost in Seminole

Even though Seminole is something like three-quarters as deep as Oklahoma City, the belief has been expressed in certain companies, operating in both fields, that the overall pumping expense at Oklahoma City will prove to be less than that at Seminole. This is attributed to the wells being straighter at Oklahoma City and to the fact that heavier surface equipment was installed there in the beginning when the wells went on the beam. This was due to lessons learned at Seminole. Another way in which Seminole experience was a guide at Oklahoma City was the discovery of the advantage of using a tubing catcher with anchor part way down the well.

The tubing catcher with anchor, sometimes called anchor catcher, or tubing catcher with stop, was found to check the breathing or stretching of the tubing (estimated to be about 15 per cent) thereby increasing the efficiency of the pump. There has been a wide use of the anchor catcher at 5,000 feet in Oklahoma City wells, in addition to the tubing catcher at the surface. This was the first Mid-Continent field where weight indicators were used to any extent in setting the anchor catcher. Their use made it possible to guard against dogleging the tubing and the resulting galling and sticking of the rods in a bind when the well is pumping.

Once existing conditions have been met and adequate equipment has been installed, pumping at Oklahoma City is not found to have unusual difficulties. Among such difficulties as exist, there are those that would be expected during this stage in pumping when there is concern for declining fluid levels and the proper setting of gas anchors and mud anchors. Paraffin seems to be increasing somewhat. A gyp condition has appeared in certain parts where there has been water encroachment, but as a rule it is soft and seldom hard enough to give trouble. So far there has been little more than a suspicion of acid. In some wells 5⅞-inch insert liners have been set where there has been trouble from shale and mud due to large amount of open hole. The general practice of cleaning out before pumping was adopted after it was found that if the money were not spent on cleaning out it would be spent later in pulling.

During the last two weeks a two-stage plunger pump has been tested by one of the major companies operating in the Oklahoma City Field. This pump has been made according to the ideas of the superintendent in collaboration with a pump manufacturer. The experiment was made with two pumps: the one at the bottom being the liner insert pump (1¾-inch bore) of the same type which had previously been used to pump the well; a second pump operating on a different principle was used at a point about 2,000 feet up the tubing. The well used has a potential of 440 bbls. In the test production increased 225 bbls. above what the well had previously made. The weight on the rods was decreased by 5,000 pounds, from 24,000 to 19,000 pounds. Results are to be announced in some detail after further tests have been completed in



Rods and tubing in a derrick pulled from an Oklahoma City field well

which certain later improvements are being tried out.

Some operators are of the opinion that, in the part of the field where they are considering what to do after gas lift, they will find that wells in the Simpson can be produced to depletion by gas lift, intermittent flow and plunger lift because reservoir pressures continue to be high.

Because of the decline of gas pressure in the Wilcox, gas lift and similar methods will soon be unprofitable. The sand has high permeability and it is expected that a large amount of oil is yet to be recovered from this horizon. And on the basis of past experience operators turn to the sucker rod pump to bring this to the surface, even though they may wish something could be found to take its place.

Certain cup manufacturers speak of new developments on the way in California which promise to overcome the difficulties which cup pumps contend with in pumping deep wells.

However, at the present time, as far as sucker rod pumps are concerned at Oklahoma City, it is a matter of getting the metal-to-metal pump that will lift the production with the least amount of pulling.

Pumping methods at Oklahoma City are being given close study since practices adopted there are expected to influence the procedure to be followed in other deep fields such as Crescent and Lucien. At Oklahoma City the sucker rod pump is face to face with a number of radical innovations which have as their object the revolutionizing of the way of lifting the oil from deep sands.

N.P.A. Report Comparing Pour Test Results Completed

The National Petroleum Association has completed a survey comparing pour test results obtained using A.S.T.M. Method D 97-34 with results obtained using A.S.T.M. Method D 97-33. The answers to the questionnaire used in the survey indicate that while a large percentage of refiners found little difference in results obtained on dewaxed motor oils there was a marked difference in test results on motor oils in which a pour inhibitor had been added.

The three questions included in the questionnaire and a tabulation of the different classifications of answers to each question follow:

1. Do the pour test results which you obtain on dewaxed motor oils using A.S.T.M. Method D 97-34 differ markedly from the results you obtain using A.S.T.M. Method D 97-33? If so, by how much?

2. Do the pour test results which you obtain on motor oils, with a pour inhibitor added, using A.S.T.M. Method D 97-34 differ markedly from the results you obtain using A.S.T.M. Method D 97-33? If so, by how much?

3. How do your pour test results using A.S.T.M. Method D 97-34 compare with the results obtained by other laboratories using the same method?

Classification of answers—	Number of refineries answering Ques. 1	Ques. 2	Ques. 3
No marked difference in two methods of tests	25	6	..
D 97-34 lower than D 97-33 by:			
Less than 3 degrees	2	..	..
Less than 5 degrees	3	3	..
5 degrees	..	2	..
5 to 10 degrees	..	3	..
10 degrees	..	5	..
5 to 15 degrees	..	4	..
10 to 25 degrees	..	5	..
20 degrees	..	2	..
Checking results satisfactorily	..	..	26
Failed to report	4	4	8

Inadequate Hole Plugging and Faulty Casing in Kansas

Studies made by the U. S. Bureau of Mines, Department of the Interior, in co-operation with the Kansas State Board of Health, have emphasized that the casing in producing oil wells must be kept in proper condition and abandoned wells must be plugged by methods suitable to the conditions in the individual wells and in the formations they have penetrated if fresh water supplies and oil and gas resources are to be protected. Salient points pertaining to mineral contamination of fresh water supplies through inadequate plugging methods or faulty casing have been presented in a brief and elementary discussion prepared by Ludwig Schmidt and C. J. Wilhelm, petroleum engineers of the Bureau of Mines. The authors of this informative pamphlet conclude that the abandoning and plugging of each well is a separate problem but show that methods are available which if used in accordance with good engineering practice should reduce to a marked degree the mineral contamination of fresh water supplies by subsurface brines.

Following prefatory statements regarding the composition of oil field brines and their effect on animal and vegetable life, the sources from which waters high in mineral content enter fresh water supplies are described. These are dealt with in two general classes, namely, subsurface and surface sources. Methods of plugging are discussed, and simple illustrations show type of improper plugs that allow depletion or mineral contamination of fresh water sands. The booklet discusses the judicious use of mud fluids and cement and their limitations and shows how faulty casing, either improperly seated or corroded, may permit brines to migrate to fresh water or oil producing horizons.

Copies of this booklet of 15 pages and five illustrations are being distributed by the Kansas State Board of Health, Lawrence, Kans., in accordance with a co-operative agreement with the Bureau of Mines pertaining to the disposal of brines.

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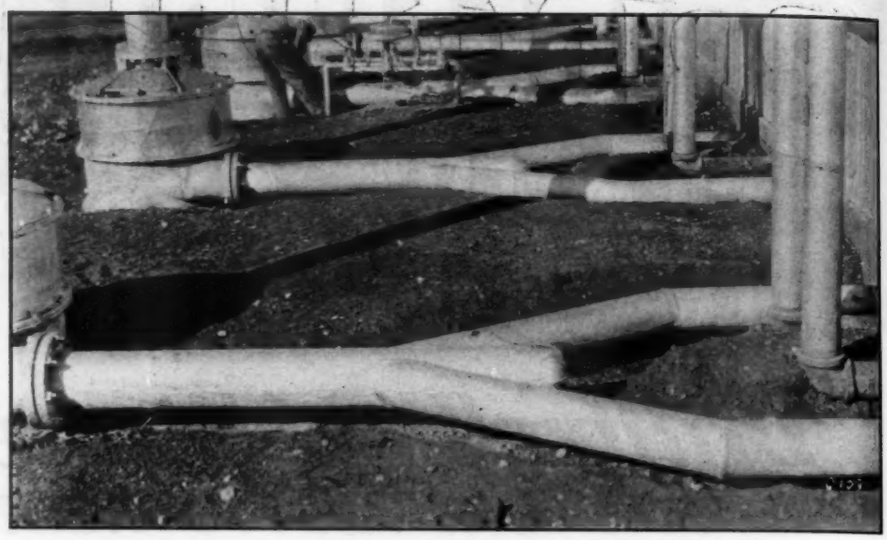
OPERATING IDEAS

Oil and Waste Reclaimer

A novel oil and waste reclaimer made from a piece of old pipe, valve, a piece of tin, and other old parts is now being used in one Texas refinery. The machinist responsible for turning out the cheaply constructed press conceived the idea from a cider press. The picture shows the simple working parts of the press which can be used in refineries, gasoline plants, pump houses and other places where waste is used in large quantities. The oil can be reclaimed for certain uses and the waste used again on some machinery after it has been squeezed dry.

Lubricating Oil Storage

Lubricating oil storage in engine houses has always been more or less a problem that has remained unsolved as far as a satisfactory method is concerned. One operator has devised and put into operation a novel and convenient means of taking oil from storage in small quantities. The accompanying photograph shows his method of arriving at the oil dispensing problem. A large, heavy drum is buried beneath the floor of the engine room and oil is forced out of this drum by compressed air supplied from auxiliary engine starting tanks. The air connections into the drum are shown as is the pressure gauge mounted on the wall. The standard, around which the large, deep tray is built, is of 2-inch pipe and extends to the bottom of the storage drum so that as air is applied under pressure to the top of the drum above the oil level the oil is forced from the bottom of the drum up through the



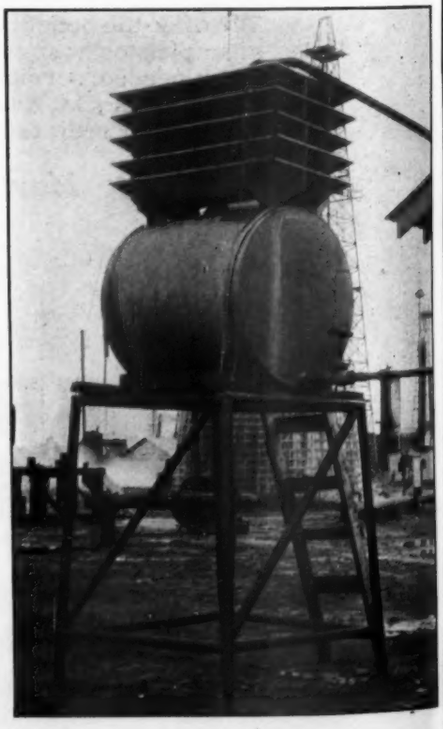
Compressor-Exhaust Vibration Eliminated

By splitting the exhaust from twin compressor engines, an operator of a natural gasoline plant near Fairfax, Oklahoma, has been successful in practically eliminating the vibration from this type of installation. When operating at capacity loads the company had been handicapped with leaks occuring between the muffler and the engines and the cushioning effect given by the 12-inch chamber shown in the base of the V exhaust pipes apparently rectified this trouble.

2-inch pipe, the flow from the drum being adjusted by the valve in the small connections which are connected to the 2-inch standard. The tray serves a double purpose in that it catches any drippings or spillage and also as a place to keep small oil cans. The small valve at the right of the tray is for draining in case this is necessary.

Cooling Tower for Engine

This cooling tower mounted on 100-gallon tank sufficiently cools the stationary engine in a small pipe line station. The amount of water flowing to the engine can be regulated by a globe valve located on an intake line at the bottom of tank. The tower is elevated 6 feet, allowing the water to flow from the bottom of the tank to the pump.

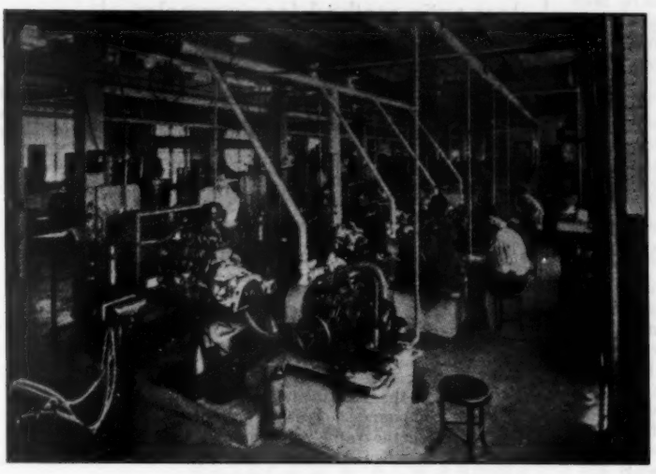


Laboratory Service Test Is Designed to Use Four Similar Automobile Motors

By R. C. CONINE

A method of determining actual service characteristics of motor oils by simulating road conditions in testing has been worked out over the past two years by investigators at Pennsylvania State College. The project is sponsored by the Pennsylvania Grade Crude Oil Association, and the work has been carried on by the department of mechanical engineering with assistance from the school of chemistry and physics and the petroleum refining laboratory.

The first step was the installation of a battery of four apparently identical Dodge automobile engines, 1933 model, having full force feed lubrication to all crankshaft, camshaft and connecting rod bearings, with sprays from small meter holes in the connecting rod bearings to lubricate the cylinders. These were set up with dynamometers (Froude D.P.X. 3 water type) capable of absorbing up to 225 horsepower at speeds up to 6,000 r.p.m. After ascertaining velocity of air past the breather on the road, blowers were installed ahead of each engine and set to give this velocity in proportion to speed. When a detached sump, to facilitate measurement of oil volume, was installed on each engine erratic results were noted in fluid level. The difficulty was traced to "burble effect" of the air current simulating road breeze. This was remedied by tying a loose canvas bag over the top of the detached sump and by venting the pipe coming down into the sump from the crankcase.



General view of engine set-up

Engine No. 1 was operated always on a reference oil, while engines Nos. 2, 3 and 4, as a group, were put on an oil to be tested, after which all engines were returned to operation on the reference oil. It was sought to determine which oil was consumed in the smallest amount and which permitted least wear in the engine while giving satisfactory performance. Iron contamination of the oil was a gauge of wear. It was found that consumption and iron contamination are influenced by: (1) Engine design and materials; (2) engine speed; (3) load; (4) mechanical condition; (5) intermittance of operation; (6) atmospheric conditions; (7) fuel; (8) spark and valve timing; (9) temperature of circulating water; (10) temperature of lubricating oil; (11) temperature in inlet manifold; (12) air velocity by breather; and (13) air-fuel ratio.

H. A. Everett, head of the department of mechanical engineering, and F. C. Stewart, associate professor of mechanical engineering, describe the development of these performance tests in Bulletin No. 44 of the Engineering Experiment Station of the college. The report includes summary charts showing the results of runs made over a period of two years.

Temperatures in these engine tests were taken at seven points: (1) Circulating water to engine; (2) circulating water from engine; (3) intake mixture; (4) exhaust gas; (5) oil in sump; (6) oil vapor in crankcase, and (7) oil in pump exit. Chromel-alumel thermocouples were used. Blow-by was measured by a gasometer devised as illustrated here. During the run, the report states, a hose was attached to the breather from the crankcase and the filling pipe was closed, the time taken to fill the gasometer gave the rate of blow-by plus leakage.

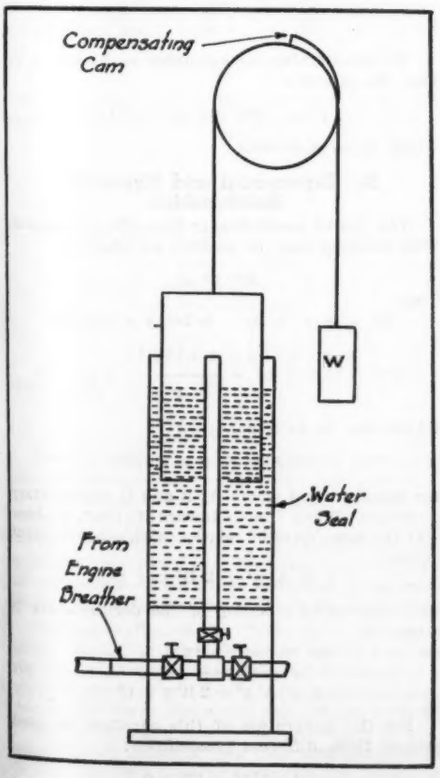
Operating conditions adopted for a standard test run, the report continues, were as follows: 3,250 r.p.m. (60 miles per hour), a load of approximately 50 brake horsepower, corresponding to the horsepower required to drive an automobile 60 miles per hour on level road, 100° F. intake mixture temperature, 160° F. outlet water temperature, 30 pounds per square inch oil pressure, and 25 miles per hour air speed past the crankcase breather. To obtain rate of oil consumption during the tests and under test operating conditions, hook gauge readings were taken every 10 minutes and plotted against time. Engine speeds were taken every 10 minutes with a revolution counter and stop watch and temperatures were read every 15 minutes. The engines were gradually brought up to load within about one hour and then operated at desired speed and load through the run. Blow-by determinations were made twice during each run.

Aside from the determinations on consumption and wear the petroleum refining laboratory provided information relating to the following major properties of new and used oil: Gravity, viscosity at 100° F., at 130° F. and 210° F.; viscosity index; gravity index; flashpoint; firepoint; pourpoint; Conradson carbon; ash; dilution; steam emulsion number; neutralization number (alcoholic extraction); sludge (naphtha insoluble); sludge (chloroform soluble).

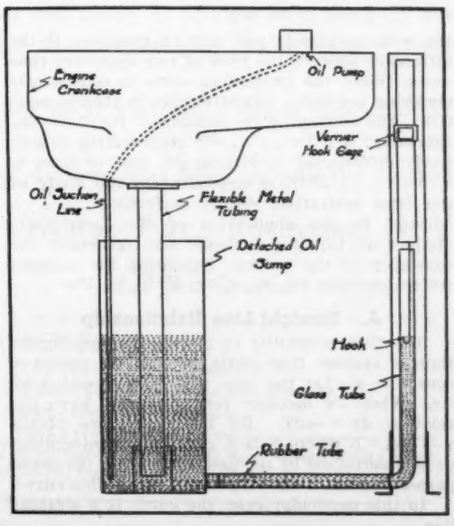
Along with the major lines of investigation the oiliness characteristics, the effects of different fuels on wear and the distribution of wear materials between exhaust gas and motor oil were studied.

In this connection it may be interesting to note the development of the Penn State Oiliness Number. The Timken machine was modified with a substitution of the fitted bearing of known area for the lower block and the elimination of the device for measuring the frictional force. A thermocouple was buried in the small bearing to give the temperature close to the surface of the bearing. The temperature of the oil supplied to the bearing was also measured. It was considered that the oil which caused the greatest increase in temperature had the greatest internal friction.

Among the variables affecting motor oil consumption was the antiknock rating of the motor fuel. It was found that in cases of moderate spark advance oil consumption increased 17 per cent over the normal amount.



Diagrammatic sketch showing overbalanced gasometer for determining blow-by



Diagrammatic sketch of detached oil sump and hook gauge arrangement

Production Decline Curve of Oil Well May Be Extrapolated By Loss Ratio

By SYLVAIN J. PIRSON
Seismograph Service Corp.

The author presents here a mathematical justification of the loss ratio method for extrapolating oil well decline curves.

A careful study of the potentialities of the existing oil wells is important from the point of view of the estimation of underground reserves and of the estimation of the future life of wells until their economic limit. A great number of formulas and of graphic methods have been proposed for that purpose. Under the present conditions of prorated production, new formulas and methods have been devised but where the assumed conditions of production remain constant during well scheduled period of flow some of the older methods are still applicable. In particular the "Loss Ratio Method of Extrapolation" devised by R. H. Johnson, the principles of which are presented in the 1927 issue of Petroleum Development and Technology of the A.I.M.E., is still applicable under well defined conditions of oil production.

In this method no simple formula is adopted for the decline curve of the well. In fact the actual formula may be very much involved as the present paper will disclose. The constants and the nature of the function representing a given production curve depends upon specific reservoir conditions (hydraulic or volumetric control), gas-oil ratio, pressure, porosity, etc. Similarly with all methods of estimating potential oil production, the Loss Ratio Method is not applicable where production characteristics are erratic; in other words, where the production decline curve presents discontinuities. It does not necessarily require the assumption that the past performance of the well will be repeated in the future provided that changes in the physical conditions of production occur gradually. The knowledge of past production during equal time elapses (day, week, month or year) is necessary over a sufficient length of time varying in duration according to the complexity of the production curve. For detailed information on the procedure followed, the reader is referred to the original paper. The purpose of the present study is to give a justification of the method and to indicate the mathematical complexity of oil well decline curves which can be extrapolated by the method under review.

Mathematically, the Loss Ratio Method of Extrapolation transposes the analysis of the decline curve to the study of the mathematical properties of the function $\tau = \frac{y}{\Delta y}$ where y is the yield of the well in barrels per unit of time, Δy is the difference between the yield of two successive time units. Since the production curve is consistently declining generally, this difference is always negative. The setting up in columns of the following functions: $\Delta\tau$, $\Delta^2\tau$ . . . . $\Delta^n\tau$ representing respectively differential variations per unit of time in τ, $\Delta\tau$, ... $\Delta^{n-1}\tau$, is equivalent to the study of the first derivative, second derivative, ... curves. In the application of the Loss Ratio Method we look for a simple law (generally the constancy of the values) regulating the columns whose headings are Δy, τ, $\Delta\tau$, $\Delta^2\tau$ . . . . $\Delta^n\tau$.

A. Straight Line Relationship

The first possibility in plotting the production figures against time units is that Δy equals a constant $-a$. Let the time unit be represented by Δx. When Δx becomes very small we have the relation $dy = -adx$. By integration we obtain $y = -ax + b$ where b is a constant of integration to be ascertained by the assumption that the curve passes through a known point of the decline curve.

In this particular case, the curve is a straight line.

B. Exponential Relationship

The second possibility is that τ equals a constant. This constant is always negative $(-a)$. We have:

$$\frac{y}{\Delta y} = \tau = -a \qquad (1)$$

The Equation (1) is written for the case where $\Delta x = 1$ and may be written

$$\frac{y}{\Delta y} = \frac{\tau}{\Delta x} = -a \qquad (2)$$

The working out of a formula for a decline curve results in the substitution of a smooth curve for a curve compounded of straight segments. By this substitution the value of τ changes and tends toward a limit when Δx tends toward zero. The limit value of τ is limit $\frac{y}{\Delta y} \times$ limit Δx. If τ is a function of x for a limited value of Δx $(\Delta x = 1)$, the same form of function will still hold when Δx tends toward zero, but the coefficients of the function will be different. As the coefficients of $\frac{y}{\Delta y}$ acquire a great value when Δx tends toward 0. the product of $\frac{y}{\Delta y}$ by Δx tends toward a fixed limit. So the formula of τ is still a function of the same degree after substituting curves for straight lines.

Equation (2) may thus be written:

$$\frac{dy}{y} = -\frac{dx}{a_1} \qquad (3)$$

a_1 having a different value than a. By integration we have: $\log y = -\frac{x}{a_1} + b$. b is a constant of integration. Or

$$y = e^{-x/a_1 + b} \text{ and } y = A\, e^{-x/a_1} \qquad (4)$$

where A is an arbitrary constant.

In this particular case where $\tau = -a$ the decline curve of the well is an exponential curve.

Example:

x	y	Δy	$\tau = \frac{y}{\Delta y}$
1	1,000	....	..
2	500	-500	-1
3	250	-250	-1
4	125	-125	-1
5	62.5	-62.5	-1

To ascertain the two constants a_1 and b, the following equations were solved:

$$1{,}000 = e^{-1/a_1 + b}$$

$$500 = e^{-2/a_1 + b}$$

which give:

$$a_1 = 1.44$$

$$b = 7.62$$

The equation of the decline curve is:

$$Y = e^{-x/1.44 + 7.62}$$

or $y = 2{,}000 \times e^{-x/1.44}$.

C. Hyperbolic Relationship

The third possibility is that $\Delta\tau$ is a constant $(\Delta\tau = -a)$. Thus $\tau = -(ax + b)$, b being a constant of integration. For the reasons mentioned above when Δx tends toward 0, a linear relation is still ruling the values of τ with other values for the coefficients: $\tau_1 = -(a_1 x + b_1)$. We have:

$$\frac{y}{\Delta y} = \frac{\tau}{\Delta x} \quad \text{or} \quad \frac{y}{dy} = \frac{\tau_1}{dx}$$

when Δx tends toward zero, or

$$\frac{dy}{y} = \frac{dx}{-(a_1 x + b_1)}$$

By integration:

$$\log y = -1/a_1 \log (a_1 x + b_1) + \log A$$

or

$$y = A\,(a_1 x + b_1)^{-1/a_1}.$$

Rem: In ordinary decline curve $\Delta\tau$ can never be positive because it would simply imply an upward swing in the curve as shown by the formula

$$y = A\,(a_1 x + b_1)^{1/a_1}.$$

Example:

x	y	Δy	$\frac{y}{\Delta y} = \tau$	$\Delta\tau$
1	1,000	....	..	....
2	500	-500	-1	....
3	300	-200	-1.5	-0.5
4	200	-100	-2	-0.5
5	143	- 57	-2.5	-0.5
6	107	- 36	-3	-0.5

By ascertaining the constants a_1, b_1, and A we find the equation:

$$y = 1{,}460\ (0.5\ x + 0.71)^{-2}$$

which is an hyperbola.

D. Exponential and Hyperbolic Relationships

The fourth possibility is that $\Delta^2\tau$ = Constant. This constant may be positive or negative

$$\Delta^2\tau = {}_1a$$

Thus:

$$\Delta\tau = a\ x + b, \qquad b \text{ being a constant}$$

$$\tau = \sum_1^x (a\ x + b) = \frac{a\ x\ (x+1)}{2} + bx + c$$

which may be written

$$\tau = A\ x^2 + 2\ B\ x + C$$

for simplification where A, B and C are arbitrary constants. When τ tends toward its limit, we have still the same form of relation with other constant values.

$$\tau = A^1\ x^2 + 2\ B^1\ x + C^1$$

The differential equation of the decline curve is then

$$\frac{dy}{y} = \frac{dx}{A^1 x^2 + 2 B^1 x + C^1} \qquad (5)$$

For the integration of this equation we must assume three different possibilities:

$$1°/A^1 C^1 - B^{12} > 0$$

which means that the τ curve does not cut the x

axis. The integration of Equation (5) in this particular case gives:

$$\log y = \frac{1}{\sqrt{A^1C^1-B^{12}}} \tan^{-1} \frac{B^1+A^1x}{\sqrt{A^1C^1-B^{12}}} + C$$

$$\frac{1}{\sqrt{A^1C^1-B^{12}}} \tan^{-1} \frac{B^1+A^1x}{\sqrt{A^1C^1-B^{12}}}$$

or $y = C\, e$

$$\text{or } y = \alpha\, e^{\tan^{-1}(\beta-\gamma x)}$$

which is a logarithmic curve. α, β, γ are three arbitrary constants.

$$2^\circ/A^1C^1-B^{12}<0$$

which means that the τ curve cuts the x axis at two points whose abscissae are

$$\frac{-B^1 \pm \sqrt{B^{12}-A^1C^1}}{A^1}$$

In this case the integration of the Equation (5) gives

$$\log y =$$

$$\frac{1}{2\sqrt{B^{12}-A^1C^1}} \log \frac{\sqrt{B^2-A^1C^1}-B^1-A^1x}{\sqrt{B^{12}-A^1C^1}+B^1+A^1x} + \log C$$

$$\text{or } y =$$

$$C\left[\frac{\sqrt{B^{12}-A^1C^1}-B^1-A^1x}{\sqrt{B^{12}-A^1C^1}+B^1+A^1x}\right] \frac{1}{2\sqrt{B^{12}-A^1C^1}}$$

$$\text{or } y = \alpha\left[\frac{\delta-\gamma x}{\delta+\gamma x}\right]^\epsilon$$

which is an hyperbola. α, β, γ, δ and ϵ are five arbitrary constants.

$$3^\circ/A^1C^1-B^{12}=0$$

which means that

$$A^1x^2+2B^1x+C^1$$

may be put under the form of $\gamma(\alpha x-\beta)^2$. In this case we have to solve the equation

$$\frac{dy}{y} = \frac{dx}{\gamma(\alpha x-\beta)^2}$$

By integration we have:

$$\log y = -\frac{1}{\alpha\gamma} \times \frac{1}{(\alpha x-\beta)} + C$$

$$\text{or } y = A\, e^{\frac{-1}{\alpha x-\beta}}$$

which is an exponential curve.

Conclusion

The few examples above-mentioned show that the more involved is the function τ, the more complex is the formula of the decline curve of oil wells.

The "Loss Ratio Method" of extrapolation has a decided superiority over the other methods since no simple law of variation with time is assumed "a priori" for the decline of the yield of oil wells.

The application of the "Loss Ratio Method of Extrapolation" of oil well decline curves does not require complicated computation of constants of a standard formula but makes a mathematical analysis of the curve and study the law of declining production as expressed by the constancy of any one of the $\Delta^n\tau$ columns. The only assumption made is that the future performance of the producing well will obey the discovered law as it should if the conditions of production are constant or varying in a continuous manner.

Prevent Destructive Foreign Matter from Ruining Pneumatic Tools

As compressed air goes through the pipe lines it picks up more or less oil, rust, scale and sediment; also water, for 10,000 cu. ft. of compressed air at 70° F. contains one gallon of water under average conditions.

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Shallow Water Bearing Sands Provide Supply for Lea County New Mexico

By L. G. E. BIGNELL

In a region where the annual rainfall averages from 15 to 20 inches it is only natural to expect few surface streams, especially as most of the precipitation occurs during short rainy seasons in the spring and fall. On the other hand finding abundant water the year round at depths from 50 to 120 feet in an area of 1,300 square miles out of a total of 4,300 square miles in this arid country is rather unexpected, but such is the case in Lea County, New Mexico.

Lea County is in the extreme southeastern corner of New Mexico and practically all lies on the Llano Estacado or Staked Plains of Texas and New Mexico, essentially a flat plain sloping gently to the east. The surface rocks consist of gravel and sand of the Ogallala formation of Tertiary age and recent sands and caliche deposits.

S. S. Nye, U. S. Geological Survey, reports the water is found in fine sands and sometimes in coarser sands and gravel of Tertiary age lying on practically impervious beds of shale of Triassic age. Mr. Nye reports the rainfall of only about 14 inches per annum and most of this water finds its way into these sands within 50 to 125 feet of the surface and form the source beds of water wells for this area. The water is used for irrigation purposes, also for domestic water supplies and more lately has been developed for drilling purposes.

Fortunately for the oil operators of southeastern New Mexico nature has provided an abundance of good water at shallow depths near the oil fields in a region where the average annual rainfall is about 14 inches.

Hobbs Town Well

At Hobbs the static level of the town's well is reported as 35 feet from the surface. The well is 15 inches diameter and 120 feet deep cased with 74 feet of 12½-inch casing. The water is produced with a deep well turbine pump having a capacity of 240 gallons per minute against a total head of 190 feet and driven by a 20 horsepower direct connected electric motor.

Some 18 months ago James M. Murray of Tulsa organized the Lea County Water Co. and started drilling wells in the Monument draw southeast of the town of Monument, Lea County, and near the recently discovered Monument oil fields. The water system was organized to furnish water for drilling wells in the Eunice Field and a 6-inch pipe line 8½ miles long was laid from the water wells in Section 9-20-37 to the north end of the Eunice Field.

The site for the water system reservoir was selected because a known supply of good water was developed there some years ago and used for cattle raising and irrigation purposes. This old earth "tank" still serves as the reservoir into which the water from the 14 wells is accumulated before it is pumped south through the pipe line system.

The wells have been drilled with cable tools and are cased with 13⅜-inch casing, perforated at the lower end and 6-inch casing set inside the 13⅜-inch string is used as the flow string. To the lower end of the 6-inch casing a working barrel of the regular type is attached and the wells pumped by jacks, the strokes varying from 14 to 26 or 27 inches.

Of the 14 water wells eight are produced by pumps actuated by rod lines running from a central geared power driven by a steam engine. This arrangement is convenient, for near the reservoir there is a steam plant for the line pumps and it is from these boilers the steam is secured to operate the engine driving the geared power.

Group of rod lines between geared central power and shallow water wells of the Lea County Water Company's system

Of the other six wells five are pumped by individual pump jacks driven by gasoline engines and one well is produced by a vertical centrifugal pump driven by a gas engine and angle belt. There is also an old windmill pressed into service at times when the demand for water is high but usually the 14 wells supply all needs and the earth tank will hold from 5,000 to 6,000 bbls. of water.

At this time the Lea County Water Co. is supplying water for 14 steam and 3 Diesel rotary drilling rigs in the Eunice and Monument Fields. Five of these outfits are in the Monument Field and the balance in Eunice Field.

The pipe line from the water source to the Eunice Field terminates at the site of one 5,000 and two 1,000 bbl. bolted steel tanks having a total of 7,000 bbls. of storage. Beyond this site 6 to 7 miles of 4-inch line has been laid to the south end of the Eunice Field and customers are being served throughout the entire length and breadth of the field.

Between the site of the 7,000-bbl. tank storage and the source of the water there are two 3,000-bbl. steel tanks erected to the store water for a supply delivered through about 8,000 feet of 4-inch line to two other 3,000-bbl. steel tanks set at the east side of the Eunice Field.

Main Lines and Station

The main pipe line and storage tanks are owned by the water company, and drilling companies desiring water usually arrange to lay 2, 3 or 4-inch lines from the storage tanks to their locations. The sites for the field storage tanks along the water pipe line were selected at high points so it is possible to distribute water to drilling locations by gravity in most instances.

The water contracts are made upon a flat rate of $2,000 for the water needed within 60 days drilling period for a steam power rotary rig and $1,000 for water for Diesel powered rigs for the same length of time. In this period it is assumed the well will be completed to about 4,000 feet depth and if additional time is required extra water is charged for in proportion to the regular contract rate.

It has been found the steam rigs powered with three 125 horsepower 350-pound pressure steam boilers use from 1,600 to 2,000 bbls. of water per day including make up water for the mud pits. On the basis of using 1,600 bbls. per day this makes the cost of water .0208⅓ cent per barrel and if 2,000 bbls. is used daily the cost is only .016⅔ cent per barrel.

For the Diesel rigs it is estimated only 1,000 bbls. will be required daily and the cost is therefore reduced to $1,000 for the 60 day drilling period but the cost per barrel remains practically the same.

It is general practice to dig two 18 feet wide by 50 feet long by from 3 to 4 feet deep pits at the rig and one reserve pit across the end of the circulation pits which is about 60 feet long and narrow and shallow. The surface in the oil fields is composed of loose sand, caliche and lime

One of three shallow water wells near oil well in the Eunice Field, Lea County, New Mexico

Portion of 6,000-bbl. capacity earth "tank" of Lea County Water Co. near Monument, N. Mex.

stone. The loose sand is scraped away and shot holes drilled to a depth of about 4 feet through the caliche and limestone. Because of the difference in hardness between the caliche and lime the shots do not break the walls clean so the pits usually are narrower at the bottom than at top. The broken rock is removed by scrapers and the loose sand and other debris stacked around the edge of the pits.

Before the pits are filled it is usual practice to wet down the sides and bottom and plaster the surface with mud. This helps to retain the drilling mud and water and as no great volume of mud is in the pits at any one time it is possible to get along with the relatively small quantity of water in drilling the 4,000 feet rotary holes.

The wells are 15-inch diameter from surface to about 300 feet, then reduced to 11¾-inch and carried to either 1,800 or about 2,700 feet where the intermediate string of casing is set and again reduced to 8¾-inch and drilled to the top of the "Big Gas" sand in which the flow string is set. Out of the flow string the hole is 6¾-inch diameter and penetrates the producing horizons of limestone.

By using good mud in the upper part of the drill hole it has been found the circulation is not lost into porous formations and the salt beds are not dissolved to form large cavities. There is some increase in hole diameter where the salt beds are penetrated but using a 5 per cent aquagel mixture plasters the salt and seals it from direct contact with the mud fluid thus retarding the formation of cavities.

Another feature being practiced quite generally in the Lea County oil fields is the use of mud screens. This mechanical means of removing the cuttings from the mud fluid reduces the actual size of the circulation pits to a minimum for it is not necessary to flow the returns from the hole through large pits to permit the cuttings to drop out of the mud. The cuttings as accumulated at the screen are shoveled away which eliminates the necessity of jetting the cuttings out of pits, another saving in mud and water.

At the mud screens samples of cuttings can be obtained at any time and this has led some operators to drill in with the regular rotary equipment. Others prefer to use the pressure control system of completing the wells and secure cuttings for samples from the bottom of the trap at the well head or out of the line leading from casing head to the trap.

The water from the Lea County wells is quite pure and does not form scale in the boilers, therefore blowoffs are infrequent, another saving in water consumption. The water is not treated before entering the boilers, an added saving by the elimination of the use of boiler compounds.

On the basis of supplying about 15 steam rigs and 3 Diesel outfits the water wells are required to deliver nearly 60,000 bbls. of water daily and the 14 wells do this easily, averaging 4,000 bbls. or more each daily. At the reservoir end of the system two large steam pumps force the water through the 8½ miles of 6-inch line under pressures at the intake end of between 450 and 500 pounds per square inch. The line is buried about 18 inches beneath the surface and is of the screwed connection type, common in this field.

In addition to the Lea County Co.'s system many of the large operators have developed their own water supply. Amerada Petroleum Co. drilled the discovery well in the Monument Field and before they did this they developed sufficient water for drilling purposes. Their system now consists of six wells about 90 feet deep. Each well is cased with 7-inch pipe and equipped with a 4-inch working barrel.

These wells are produced by the use of pump jacks and gas engines and the water is delivered into bolted steel tanks set on an elevation. To these tanks is connected a 6-inch pipe line through which the water is distributed to drilling wells and to the camp site where it is used for domestic purposes. Each well is capable of producing about 1,000 bbls. of water daily with the present equipment.

In the Cooper Field the Phillips Petroleum Co. have several water wells and a distributing system. Other operators have wells near drilling locations and have equipped same with pump jacks and gasoline engines by means of which ample water for drilling purposes has been made available at all times. After the wells were completed some of these plants have been operated to provide water for the lease.

Simplification of Oil Manifolds Is the Trend in Modern Pipe Line Stations

As pipe line systems are perfected there is a tendency to simplify station and line details and at the same time to handle the oil from the wells to destination in as direct a manner as possible. This tendency has brought about the simplification of the pipe manifolds and the accompanying picture shows the interior of the Haven, Kans., station manifold house of the Stanolind Pipe Line Co.

The oil originates in western Kansas and is pumped through this system to Eldorado and eastern Kansas. The pipes and other parts used in this station have been labeled. Starting with the 16-inch suction line from the work tank at this station it is possible to trace the path of the oil through the pumps and back into the 8-inch line for Eldorado. The lines are duplicated to accommodate the several pumps used at this plant and there is one extra tube turn welded into the 8-inch discharge line that may be used to increase capacity whenever desired.

This type manifold is standardized and the various units were assembled at the shop of the Stanolind Pipe Line Co. in Tulsa and shipped to the stations at Haven and Hudson to be installed. This eliminates a lot of field labor and insures uniform equipment. The assembly was completed by bolting the parts together at the various flanges and this facilitated installation and if at any future time it is desired to salvage this material it can be easily done.

It will be noted this manifold is in a concrete pit and if any oil escaped means are provided for picking it up quickly and returning it to the system. The building is practically fireproof and the only thing to burn would be oil that might spill and accumulate. This hazard is almost negligible for the attendants at the station keep a close watch for leaks of breaks in the line. As all parts of the manifold have a good margin of safety over working pressure there is little danger of breakage.

Interior of the Haven, Kans., pipe line station of the Stanolind Pipe Line Co., showing the manifold arrangement which is an example of the simpler and more effective type

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph.D., Technical Editor

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit problems to Dr. C. K. Francis. Questions should give as much detail as possible. Inquiries must be signed but only the given initials will be printed. The source of questions is considered confidential. Questions requiring discussion of patents, the use of intricate formulas, extended computations, or cost estimates cannot be considered in these columns.

A.P.I.-A.S.M.E. Code for Tanks for Petroleum Liquids and Gases

Please advise us where we can obtain information to determine the maximum safe working pressure for various kinds of steel tanks, knowing the gauge, dimensions, and type of construction. Curves would be preferred. However, a general formula as simple as possible would be satisfactory.—R. A. S.

The A.P.I.-A.S.M.E. Code for the design, construction, inspection and repair of unfired pressure vessels for petroleum liquids and gases, is the authority in the petroleum industry.

When determining the safe working pressure of a tank a series of computations are necessary. These include calculations for thickness of shells, head thickness, joint efficiency, connections for nozzles, hand holes and manways and reinforcement of single openings.

Quoting from the code, page 115, Section 1-122: "The allowable working pressure for a vessel in operation shall be computed with the appropriate formulas in the construction sections of the code, using dimensions actually determined by inspection for the thickness t and twice the estimated corrosion allowance before the next inspection as c in the formulas, and making suitable allowance for the other loadings enumerated in the construction sections of the code.

"In the case of riveted vessels the allowable working pressure shall be computed for all riveted joints and for the shell and heads away from any joints using t and c as described above, and E as follows:

(a) For riveted joints the calculated efficiency

(b) For shell and heads away from joints as 1.

"The allowable working pressure shall be the least of those determined by these calculations.

"Allowable working stresses shall be those specified in the construction sections of the code except that, when the temperature of the metal is below 200° F. and is not subject to sudden variations, the allowable working stress may be gradually increased as the thickness decreases to 1.15 times that specified in the construction sections, before the vessel is retired or the allowable working pressure decreased."

M. E. Clawson and T. O. Duller presented a paper at the Dallas A.P.I. meeting November 15, 1934, describing the use of nomographs for determining the optimum design of unfired pressure vessels. This is the simplest method for determining the tank conditions. The graphs are intended to supplement the code and the code paragraph numbers are included for reference purposes.

Copies of the A.P.I.-A.S.M.E. Code and the paper mentioned may be obtained from the American Petroleum Institute, 50 West Fiftieth Street, New York City.

Ignition Temperature and the Knock Value Not Always Related

Do you have any reference to research work that shows a connection between the ignition temperature and the antiknock value of different compounds when used in the automobile engine?—B. E. A.

The authorities appear to agree that there is no definite relation between ignition and knock rating. Early investigators suggested that compounds having a high ignition temperature were liable to show a high antiknock value. However, it has been demonstrated that there are so many exceptions to this rule that no reliable conclusions can be drawn. Alcohol, for example, with a relatively low ignition temperature has a rating equivalent to toluene, showing an ignition temperature 245°C. higher.

Egerton and Gates presented some data illustrating a possible connection between ignition temperature and knock rating, as expressed in terms of highest useful compression ratio (H.U.C.R.). The table following has been arranged from their work.

IGNITION TEMPERATURE AND KNOCK RATING

	Ignition °C.	Temperature °F.	Knock rating H.U.C.R.
Heptane	430	806	3.7
Ether	440	824	3.5
Hexane	470	878	4.8
Alcohol	515	960	7.0
Pentane	515	960	5.7
Cyclohexane	535	995	6 6
Benzene	675	1247	6.9
Toluene	760	1400	7.0

The same authorities mention a gasoline with an ignition temperature of 460°C. and an H.U.C.R. of 5.1.

Reference: Egerton and Gates, J. Inst. Pet. Tech., 13, 244, 1927.

Desulfuring Power of Filtering Earths Not of Practical Value

Can you supply me with information concerning the use of the filtering earths for desulfuring crude petroleum or the distillates?—E. C. H.

Some earths, aluminum oxide and silica gel have a limited desulfurizing action on petroleum distillates. Silica gel has been shown to reduce the sulfur content of the lubricating oil fraction and to have a similar action on the light oil distillates. Roasted bauxite is reported by Dunstan, Thole and Remfry, when used in large quantities, 9 pounds per gallon, to reduce the total sulfur content of naphtha from 0.134 to 0.017 per cent.

The desulfurizing of fuller's earth and the activated earths appears to be very low. Several investigators have demonstrated that fuller's earth, acting at high temperatures, 750° F., removes ordinary sulfides quite satisfactorily, the desulfides and secondary sulfides only partially and but a trace of the thiophenes.

The bleaching earths do not appear to have enough desulfurizing action for the refining of petroleum fractions.

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Introduction of Tetraethyl Lead for Antiknock Motor Fuel

When was gasoline containing tetraethyl lead as an antiknock motor fuel first made available to the general public?—A. R. N.

Following the discovery of the knock inhibiting property of tetraethyl lead, the General Motors Chemical Co. distributed the product through the Refiners Oil Co., marketer of gasoline in Dayton, Ohio, and adjacent territory. This began in 1921, continuing until October, 1923, when a contract was entered into with the Standard Oil Co. (Indiana) and the Refiners Oil Co., granting them the exclusive right to distribute Ethyl Gasoline in 11 midwestern states for a period of 18 months.

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RODESSA OIL

From I. L. Young, well No. 1—	
Gravity, A.P.I.	42.6
Gasoline	32.1
Gr. 60.2	
Kerosene distillate	20.0
Gr. 47.2	
Gas oil	11.9
Gr. 39.0	
Lub distillate	15.5
Residuum	18.9
Loss	1.6
Sulfur	0.18
S. U. Vis. at 100° F.	38 sec.
Pourpoint	25° F.
Color	dark green

The Rodessa Field, at the junction of the boundaries of Louisiana, Arkansas and Texas, has produced gas for a number of years. The oil-producing formation in this field is found at a depth of approximately 6,000 feet below the surface in what is reported by geologists to be the upper Trinity (Glen Rose lime).

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LUMMUS OIL HEATERS

Have a minimum foundation load

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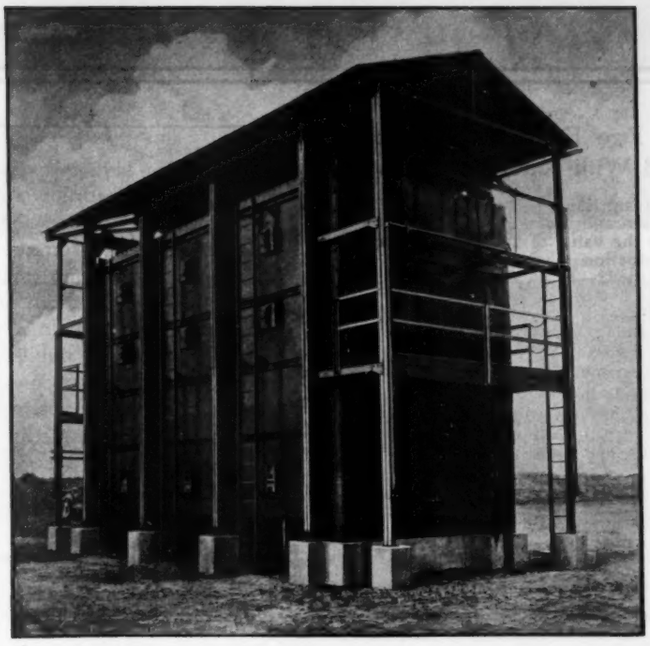

In the Lummus Oil Heater the weights of the arch and walls are but one-fifth to one-third of the ordinary sectionally supported arch or wall.

Because of the high heat transfer rates utilized, the smaller amount of tubes and supports required correspondingly reduces weight.

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THE LUMMUS COMPANY, 50 CHURCH STREET, NEW YORK, N. Y. • BUSH HOUSE, ALDWYCH, LONDON, W. C. 2

LUMMUS

PETROLEUM REFINING PLANTS

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph.D., Technical Editor

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit problems to Dr. C. K. Francis. Questions should give as much detail as possible. Inquiries must be signed but only the given initials will be printed. The source of questions is considered confidential. Questions requiring discussion of patents, the use of intricate formulas, extended computations, or cost estimates cannot be considered in these columns.

A.P.I.-A.S.M.E. Code for Tanks for Petroleum Liquids and Gases

Please advise us where we can obtain information to determine the maximum safe working pressure for various kinds of steel tanks, knowing the gauge, dimensions, and type of construction. Curves would be preferred. However, a general formula as simple as possible would be satisfactory.—R. A. S.

The A.P.I.-A.S.M.E. Code for the design, construction, inspection and repair of unfired pressure vessels for petroleum liquids and gases, is the authority in the petroleum industry.

When determining the safe working pressure of a tank a series of computations are necessary. These include calculations for thickness of shells, head thickness, joint efficiency, connections for nozzles, hand holes and manways and reinforcement of single openings.

Quoting from the code, page 115, Section 1-122: "The allowable working pressure for a vessel in operation shall be computed with the appropriate formulas in the construction sections of the code, using dimensions actually determined by inspection for the thickness t and twice the estimated corrosion allowance before the next inspection as c in the formulas, and making suitable allowance for the other loadings enumerated in the construction sections of the code.

"In the case of riveted vessels the allowable working pressure shall be computed for all riveted joints and for the shell and heads away from any joints using t and c as described above, and E as follows:

(a) For riveted joints the calculated efficiency

(b) For shell and heads away from joints as 1.

"The allowable working preasure shall be the least of those determined by these calculations.

"Allowable working stresses shall be those specified in the construction sections of the code except that, when the temperature of the metal is below 200° F. and is not subject to sudden variations, the allowable working stress may be gradually increased as the thickness decreases to 1.15 times that specified in the construction sections, before the vessel is retired or the allowable working pressure decreased."

M. E. Clawson and T. O. Duller presented a paper at the Dallas A.P.I. meeting November 15, 1934, describing the use of nomographs for determining the optimum design of unfired pressure vessels. This is the simplest method for determining the tank conditions. The graphs are intended to supplement the code and the code paragraph numbers are included for reference purposes.

Copies of the A.P.I.-A.S.M.E. Code and the paper mentioned may be obtained from the American Petroleum Institute, 50 West Fiftieth Street, New York City.

Ignition Temperature and the Knock Value Not Always Related

Do you have any reference to research work that shows a connection between the ignition temperature and the antiknock value of different compounds when used in the automobile engine?—B. E. A.

The authorities appear to agree that there is no definite relation between ignition and knock rating. Early investigators suggested that compounds having a high ignition temperature were liable to show a high antiknock value. However, it has been demonstrated that there are so many exceptions to this rule that no reliable conclusions can be drawn. Alcohol, for example, with a relatively low ignition temperature has a rating equivalent to toluene, showing an ignition temperature 245°C. higher.

Egerton and Gates presented some data illustrating a possible connection between ignition temperature and knock rating, as expressed in terms of highest useful compression ratio (H.U.C.R.). The table following has been arranged from their work.

IGNITION TEMPERATURE AND KNOCK RATING

	Ignition °C.	Temperature °F.	Knock rating H.U.C.R.
Heptane	430	806	3.7
Ether	440	824	3.5
Hexane	470	878	4.8
Alcohol	516	960	7.0
Pentane	515	960	5.7
Cyclohexane	535	995	6.0
Benzene	675	1247	6.9
Toluene	760	1400	7.0

The same authorities mention a gasoline with an ignition temperature of 460°C. and an H.U.C.R. of 5.1.

Reference: Egerton and Gates, J. Inst. Pet. Tech., 13, 244, 1927.

Desulfuring Power of Filtering Earths Not of Practical Value

Can you supply me with information concerning the use of the filtering earths for desulfuring crude petroleum or the distillates?—E. C. H.

Some earths, aluminum oxide and silica gel have a limited desulfurizing action on petroleum distillates. Silica gel has been shown to reduce the sulfur content of the lubricating oil fraction and to have a similar action on the light oil distillates. Roasted bauxite is reported by Dunstan, Thole and Remfry, when used in large quantities, 9 pounds per gallon, to reduce the total sulfur content of naphtha from 0.134 to 0.017 per cent.

The desulfurizing of fuller's earth and the activated earths appears to be very low. Several investigators have demonstrated that fuller's earth, acting at high temperatures, 750° F., removes ordinary sulfides quite satisfactorily, the desulfides and secondary sulfides only partially and but a trace of the thiophenes.

The bleaching earths do not appear to have enough desulfurizing action for the refining of petroleum fractions.

REFERENCES

Dunstan, Thole and Remfry, J. Soc. Chem. Ind., 43, 179T, 1924.

Wood, Sheely and Trusty, Ind. Eng. Chem., 18, 169, 1926.

Youtz and Perkins, Ind. Eng. Chem., 19, 1,247, 1927.

Introduction of Tetraethyl Lead for Antiknock Motor Fuel

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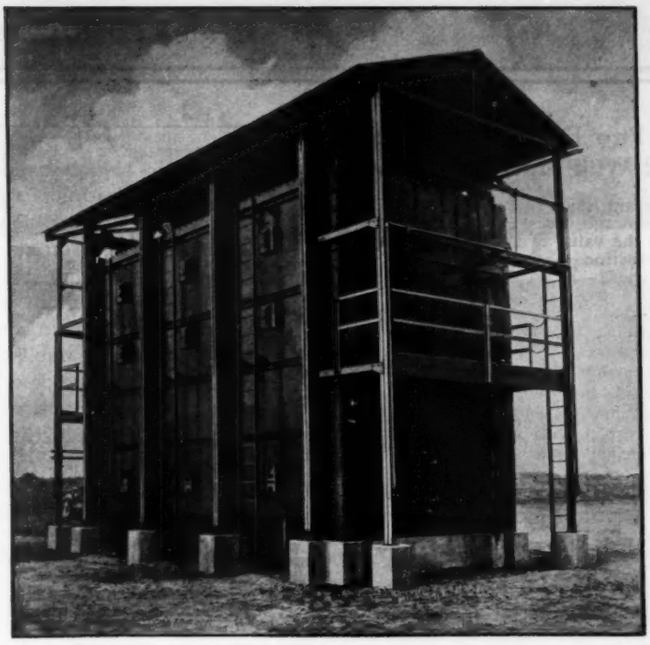

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LUMMUS

PETROLEUM REFINING PLANTS

PROBLEMS FROM READERS

Edited by T. F. Smiley

Steam as Fire Extinguisher Should Be Used With Much Discretion

How are steam lines, for use in case of fire, connected to storage tanks containing crude or gasoline? Has the value of such steam lines for affording protection against fire been thoroughly established?—E. R. S.

W. T. Gettings, fire and safety marshal of the Conewango Refining Co., provides the following answer to your questions:

"Steam has undoubtedly put out many fires and just as surely has aggravated others. We know of at least one case where a 5,000-bbl. gasoline tank was extinguished with water, but this isolated case does not mean that water is suitable to extinguish a gasoline fire.

"If a tank is very full and the roof has been blown off, or at least blown off on the side opposite the entrance of the steam, the steam will probably aggravate the fire, and may even blow oil or gasoline onto the ground.

"Bearing these things in mind, however, we do believe that steam connections to tanks are very valuable additions to fire equipment, though they must be used with discretion just the same as other fire equipment.

"When attaching steam lines to oil tanks to be used for fire protection, we would suggest a single hub flange be placed on the top of the shell as near the top angle as possible, a long thread nipple screwed through this flange, and a tee screwed on the nipple on the inside of the tank in a horizontal position. We suggest a single hub flange and long thread nipple because in this way the tee can be placed closer to the shell of the tank and it is of some advantage to have the steam hit the shell tangentially. This will put a blanket of steam in the top of the tank with the lowest velocities possible. High velocities might cause drafts across the oil and fan up the fire instead of choking it out.

"Outside of the tank an ell looking up should be screwed on the nipple, then another nipple and flange union which should have a blind gasket of tinfoil or some other light sheet packing which would seal the line against condensation from the tank. From the flange union, the line can be run to the ground or in any other convenient way to reach the steam supply.

"The nipple going onto the tank and the tee inside the tank should be at least two sizes larger than the steam line feeding the tank. For instance, if a 1½-inch or 2-inch is used, then a 4-inch flange should be put on the tank, and a 4-inch nipple and tee used.

"Considerable advantage is gained in slowing down the velocities of the steam as it enters the tank. It spreads over the surface better and also gives an appreciable instant of time to evaporate any moisture in the steam after the expansion from the 2-inch to the 4-inch line takes place.

"Of course, the tank should be covered quickly. But it will not do any good, and may do harm, to attempt to cover a tank so quickly that it takes too high a percentage of the boiler house power, and does not leave enough to run fire pumps. For this reason, calculations should be made for each plant and the size of steam feed lines installed accordingly.

"When possible, it is agreed that it is desirable to fill 3 or 4 feet of the tank with steam in one minute, but if a line is put in that is too large for the boiler house to carry, in the excitement of the fire it is likely to be opened wide, even though in saner moments the men realize that it should not be done.

"The safest procedure is to put in a line that is big enough to give the service desired, and at the same time not big enough to interfere with the steam supply. This point should be considered more in the smaller plants than in the large plants that have a large boiler capacity."

Readers are invited to send questions relating to drilling, producing and transporting operations. These questions will be referred to persons capable of answering authoritatively. The names of those writing for information will be held confidential, initials only being published. This department cannot undertake to answer questions involving investments, patents or intricate formulas or those which properly should be submitted to consulting engineers, geologists or lawyers.

Producing Formation in the Zwolle Field of Louisiana Not a Sand

Will you advise me at what depth and from what sand production is obtained in the Zwolle Field of Louisiana?—E. W. C.

The producing formation in the Zwolle Field, Louisiana, is not a sand. It is reported that the oil comes from crevices in the chalk rock of Upper Cretaceous age on a faulted anticline, and the depth of the wells varies from 2,280 to 2,441 feet. This chalk rock is called Saratoga and Annona formation and it is soluble in hydrochloric acid.

WHY THEY CALLED IT
Rhabdomancy

This impressive-looking word is little more than a highbrow form for our old friend the hazel twig, much employed in the early search for oil and even now finding adherents. It is made from two Greek words, one meaning rod and the other meaning divination. The "enchanted twig," as it was called, was held in high esteem by early Greeks and Romans. In the thirteenth century it was widely used in the Orient, according to Marco Polo. It reached England in the reign of Queen Elizabeth (1558-1603). As recently as 1931 the British Imperial Geophysical Experimental Survey, investigating mineral deposits in Australia, found official water-diviners, attached to the governments of two Australian states, using hazel forks.

Drilling Mud Does More Than Raise Cuttings and Seal Off the Wall

Does the mud that is used in rotary drilling perform any important functions in addition to lifting the bit cuttings to the surface and sealing off the face of the hole as the drilling proceeds? How may a good drilling mud be recognized? What are its important properties?—D. S. T.

Many rotary operators do not give proper consideration to the condition of their mud. Often it is either good or bad according to the individual driller's opinion and experience. Differences of 3 pounds per gallon in mud used in the same field, under practically identical conditions, have been observed. One well showed a difference of 1½ pounds per gallon during a single period of 12 hours. Greater drilling efficiency results if the correct type of mud is maintained.

The functions of a mud used in rotary drilling may be summarized as follows, according to Professor John Franklin Dodge and A. C. Frietsche in a joint paper prepared by them:

1. To remove the cuttings loosened by the bit.
2. To wall up the hole:

(a) To prevent the drilling fluid from penetrating the formation, possibly causing damage to a water or a gas sand exploited in another well, and also to insure the return of the fluid to the surface to allow its reuse.

(b) To consolidate loose sands and thereby prevent sloughing off of walls into the hole.

(c) To seal off minor gas, oil or water sands.

(d) To form a smooth coating on the sand walls to reduce friction on the drill pipe, and to facilitate the running of casing.

3. In conjunction with No. 2, to exert a fluid pressure on the exposed gas, oil or water sands to prevent these sands from blowing out and interfering with the drilling of the well.

4. To hold cuttings in suspension during intervals of suspended circulation while running drill pipe in or out of the hole or while fishing.

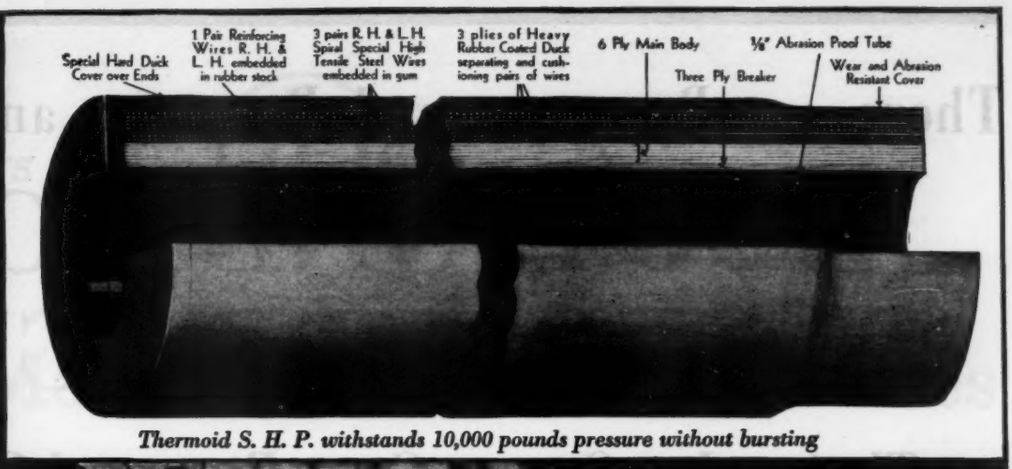
Practically any mud will perform the functions 1 and 2 and will cover No. 3 fairly well, particularly when weight material is used.

Nos. 2a, 2b, 2c and 4 are intimately connected with the colloidal properties of the mud used in that the quantity of colloidal material will greatly affect the rapidity of the formation of an impervious cake on the wall of the hole, and again, the colloidal content will affect the nature of the mud with direct bearing on its ability to form a gel.

Drilling muds, Professor Dodge and Mr. Frietsche point out, may look "thick" or "thin." They may look "light" or "heavy." But the most satisfactory way of settling the question is by a viscosity determination. They go on to say that a good drilling mud should resemble in consistency a heavy motor oil, with a uniformity of appearance, showing no sharp boundaries between the solid particles and the suspending liquid. After standing overnight there should be little or no free water on the surface, and only traces of sand settled out. There should be a gelling action which will be readily reversible allowing a return of the mud to its original liquid state on agitation.

It is recognized today that the most important mud properties are weight or specific gravity and consistency, again calling to mind that the last term is better known in actual practice as viscosity. The proper density is necessary that sufficient hydrostatic head or pressure may be maintained to overcome any gas pressure encountered, while the viscosity or fluidity governs largely the rate at which the cuttings settle out of the circulating mud, as well as the ease with which the pumps may handle the mud.

★ The SAFETY FACTOR is greater in this ROTARY HOSE ★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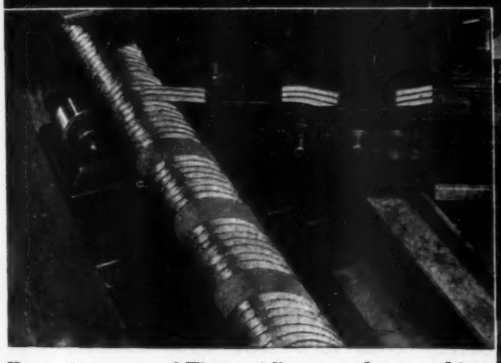

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Look under the names, however, and you'll find most of them are oil-*refining* processes to remove unwanted elements from the oil.

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—added oiliness, more than any mineral oil has naturally!

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It gets you new customers; and, because they know other oils are not like Germ Processed Oil, they *stay your* customers.

Get the whole interesting story of the first alloyed oil by writing for a Conoco man to call on you, without obligation. It will pay you.

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CONOCO

Securing Maximum Production Rates With Lifting Cost Kept at Minimum

By BRUCE H. ROBINSON
General Petroleum Corp. of California*

A.P.I.— The character of proration plans in most fields and absence of proration plans in other fields generally require pumping at the maximum practicable rate. Here the author discusses methods by which maximum production rate and minimum lifting cost may be had.

In the absence of curtailment, protection against drainage dictates a policy of pumping at the maximum practical rate; while under curtailment, which is generally based upon potential, ability to demonstrate potential is unfortunately obligatory. Fortunately for ultimate recovery, maximum practical pumping rates are generally less than drastically-curtailed flowing rates were during the early life of the field. Moreover, during the late life of a well, maximum pumping rate increases ultimate recovery by postponing abandonment.

A. Maximum Production

1. Pump Depth—Lowering tubing always tends to increase production, although there are wells

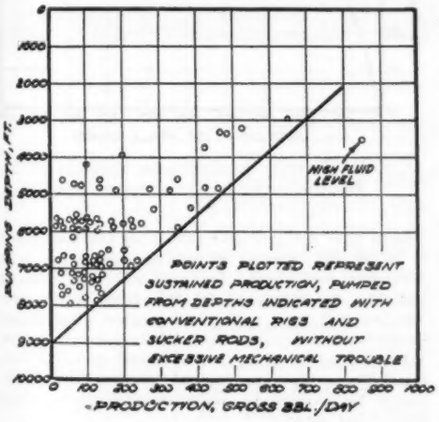
PUMPING DEPTH, FT.
HIGH FLUID LEVEL
POINTS PLOTTED REPRESENT SUSTAINED PRODUCTION, PUMPED FROM DEPTHS INDICATED WITH CONVENTIONAL RIGS AND SUCKER RODS, WITHOUT EXCESSIVE MECHANICAL TROUBLE
PRODUCTION, GROSS BBL./DAY

Fig. 3—Effect of pumping depth, pump capacity

with bad pipe and wells in which troublesome sand conditions are aggravated by increased depth —and in such cases the benefits of deep tubing cannot be realized.

One of the latest tools of the production man is the bottom-hole pressure gauge, which makes it possible to evaluate the effect of deep tubing in advance of trial. With the pressure gauge, productivity factors are determined. "Productivity factor" is defined as the number of barrels per day that are produced per pound differential pressure between the formation and the well. Factors range from 0.1 bbl. up to about 10 bbl. per pound of differential. Oil of 30 degrees A.P.I. exerts a pressure of 38 pounds per square inch for each 100 feet of fluid column, so that each reduction of the fluid level by 100 feet will tend to increase production as follows:

Minimum rate of increase 38 x 0.1 = 3.8 bbls. per day.
Maximum rate of increase 38 x 10 = 380 bbls. per day.

As an actual example, in a Los Angeles Basin well the tubing was lowered from 4,576 feet to 4,606 feet. Production increased from 20 bbls. per

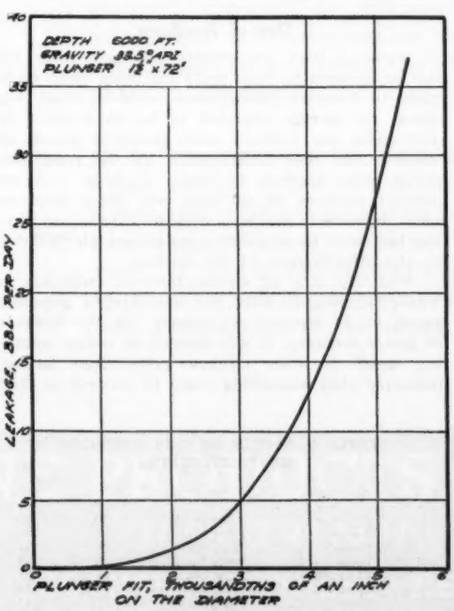

Fig. 1—Leakage past oil-well plungers

day to 80 bbls. per day, a high return for the cost of 30 feet of tubing and rods.

In addition to the direct advantage of deep tubing, lowering will occasionally place the pump below oil froth. Froths are common in the more viscous oils; and, although more unusual, may also be found in wells producing higher gravities. Frothy oil is rarely found near the bottom of a well, but may occur higher up. One of the deeper wells at Santa Fe Springs gave considerable pump trouble and small production at first. Tubing was fairly close to bottom; and, although various combinations of pumps and pumping speeds were tried, production could not be increased. A bottom-hole-pressure survey indicated that froth

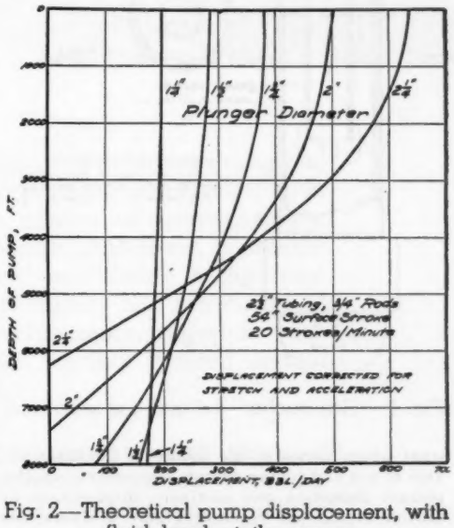

Fig. 2—Theoretical pump displacement, with fluid level at the pump

was present. Tubing could be lowered only about two joints (from 6,796 to 6,843 feet) but this was enough to place the pump inlet below the froth, and production increased from an average of 135 bbls. per day to 235 bbls. per day. Only about 35 bbls. of the increase could be attributed to lowered tubing due to lower productivity factor than in the well previously mentioned, leaving a 65-bbl. increase due to elimination of froth from the pump.

2. Pump Capacity—The best types of modern oil-well pumps are very efficient for pumping liquids. Losses of production due to delayed valve action are small, and slippage of oil past plungers is fairly well known. Slippage has been determined by laboratory tests, and more recently by field tests. For the latter a 4,000-foot well was used. Static pressure was determined by two sub-surface pressure surveys. Tubing was tested, and found

*Delivered before Los Angeles meeting, American Petroleum Institute. Author's title, "Economics of Pumping."

to have no leaks. Pump barrels and plungers were carefully measured before tests, and examined for wear after use. Pumps were operated without standing valves, and the tubing was filled with oil from the surface. Leakage past the plunger was determined by gauging, in a small drum, the oil necessary to keep the tubing full. Dynamometer cards were taken frequently to determine plunger action and assure that no sticking occurred. Rods were kept in motion at the same speed and stroke for each run. Figure 1 shows leakage rates computed from data of this test for a 6,000-foot well. Leakage is assumed to be proportional to depth and plunger diameter, and inversely proportional to length of plunger and viscosity of oil. It was found to increase about as the cube of the fit of the plunger. As shown in the curve, an 0.002-inch clearance gives a leakage of 1.3 bbls., and an 0.005-inch clearance gives a leakage of 27 bbls. per day. It is possible to have volumetric efficiencies of nearly 100 per cent, although installations will require far less frequent servicing if additional displacement is provided to maintain production after pumps wear.

Pump of Size

Selection of the correct size of pump for each condition is also important. The displacement of a pump is equal to the length of stroke, times the number of strokes per minute, times a constant which varies as the square of the diameter. Due to rod and tubing stretch, successively smaller plunger diameters give maximum displacement as greater depths are reached. Figure 2 shows this relationship for a pumping machine giving the stated stroke and speed. The 2¼-inch plunger displaces 635 bbls. at zero depth, which is more than for any of the smaller sizes. At 4,300 feet, displacement has been reduced by stretch to 330 bbls. per day, and equals that of a 2-inch plunger. At 6,250 feet, the plunger stroke has been reduced to zero, and no production can be secured. Similarly, each size yields in maximum displacement to the next smaller size—until, at 8,000 feet, a 1¼-inch plunger secures the maximum displacement, 165 bbls. per day. Maximum practical displacement is limited, for any depth, to the strength of rods. Figure 3, based upon experience, shows the economic limit of production for various depths. Points plotted represent sustained production pumped from fluid levels indicated with conventional rigs and sucker rods, without excessive mechanical trouble. Production declines from 800 bbls. per day at 2,000 feet to zero at about 9,000 feet.

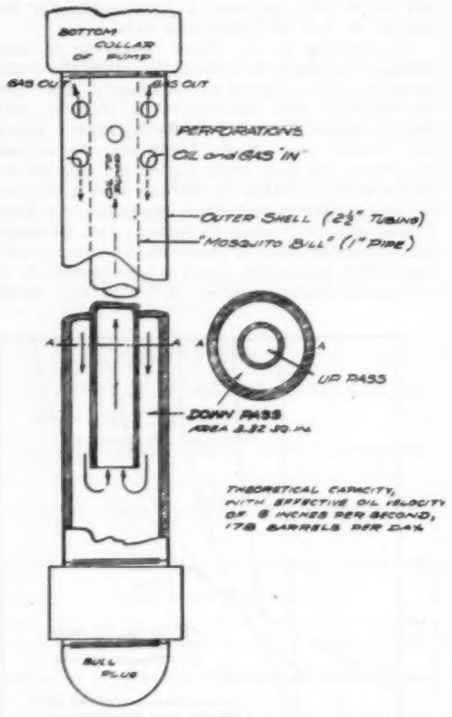

Fig. 4—"Gas anchor" (oil and gas separator)

This does not mean that more fluid cannot be pumped, but does mean that if the indicated limit is exceeded, mechanical trouble will be expensive.

3. Gas—An important factor in procuring maximum production is the elimination of gas from the pump. Pumping of gas takes power and utilizes displacement that should be reserved for pumping oil. It is unnecessary, as gas will flow out through the casing, if given a chance by use of an efficient gas anchor, small casing pressure, and enough clearance between tubing and casing.

Gas in Pump

Gas in the pump can seriously curtail the oil production of small wells as well as large ones. An extremely small amount of free gas in the well at the pump level may cause trouble. If 100 cubic feet of free gas per barrel of oil were to go through a pump at a 10-pound suction pressure, the displacement would be utilized in the ratio of 10.6 bbls. of gas for every barrel of oil—even if the pump had sufficiently small clearance to act as a perfect compressor. A 1½-inch plunger, operating with a 50-inch stroke, would have to make 88½ strokes per minute to handle 100 bbls. per day from such a well.

A gas anchor is an oil-and-gas separator attached to the pump, and it should admit oil freely while preventing the entrance of gas. The only principle of separating gas from oil known to be applicable is gravity separation. Gas is lighter than oil; and, if velocities are low, will rise through it and escape. Figure 4 shows a simple type of anchor commonly in use. Oil and gas entering the anchor start to flow downward in the annular space between the outer pipe and the inner tube, commonly called the "mosquito bill." Velocity should be less than the rate of rise of the gas bubbles through the oil. Experiments conducted at the University of Wisconsin indicate that the rate of rise is normally above 6 inches per second in water. Capacity of an anchor is proportional to down-pass area; as the larger the down-pass, the greater the volume that can be handled at a given velocity. Length of down-pass need not be great. Anchors are commonly about 21 feet long, although shorter ones have been used. In an old well in Coalinga the fluid level was extremely low, and it was desirable to place the pump as near the bottom as possible. In this installation an anchor of only 30 inches over-all length was used, and proved entirely capable of handling the production of the well. To decrease entrance velocity and thereby reduce amount of gas drawn into the anchor and to allow free escape of separated gas from within the anchor, a multiplicity of holes in the top outer shell must be provided. Short length and large diameter for the mosquito bill will prevent reduction of pressure of oil already separated, and will prevent dissolved gas from coming out of solution and entering the pump.

Use of Anchors

Table 1 lists the results obtained from the use of anchors in nine wells scattered from Richfield to Ventura. More cases could be cited, but these are merely intended to be illustrative. In two cases the anchors were installed where no anchors had been used before. In the remaining seven cases anchors of larger capacity replaced smaller anchors. In no case was pump displacement increased, nor was tubing lowered; so that the increases in production noted are attributable to the effectiveness of the anchors.

Well No. 2 is of special interest. Orginally it was producing 33 bbls. per day with a pumping speed of 24 strokes per minute. In the interest of power economy, it was decided to reduce pumping speed to seven strokes—calculations having indicated that production could be secured at that speed with moderately-high volumetric efficiency. The calculations were correct, power input was certainly reduced, but production secured was a great disappointment—the gauge tape at the end of 24 hours showing a production of only 6 bbls. An anchor was installed; and, with no increase in speed, production climbed to 37 bbls. per day. This was a 12 per cent increase of production, and $453 per year was realized in power saving.

TABLE 1—EFFECT OF GAS ANCHORS ON PRODUCTION

Well No.	Changed from	Changed to	Increase (Barrels)	Increase (Per cent)
1	No anchor	Type No. 2	50	28
2	No anchor	Type No. 2	4	12
3	Type No. 1	Type No. 2	102	65
4	Type No. 1	Type No. 2	76	31
5	Type No. 1	Type No. 2	21⅛	88
6	Type No. 1	Type No. 2	30	158
7	Type No. 1	Type No. 2	33	21
8	Type No. 1	Type No. 2	68	110
9	Type No. 1	Type No. 2	23	23

Some wells pump successfully without anchors due to complete absence of free gas, but they are less common than is generally supposed. A good gas anchor can do no harm. It may increase production substantially, and permit operating economies not otherwise possible.

A completely closed-in casinghead will hold a back pressure on the sand—thereby limiting potential production—and will force all gas to be produced through the pump, and make even the best gas anchor ineffective. Each 10 pounds of casinghead pressure held is equivalent, with oil of 30 degrees A.P.I., to raising the tubing 26 feet, with accompanying loss of production as previously indicated. Reducing pressure has been advantageous on many wells. For example, in one case a reduction in pressure of only 10 pounds increased production from 79 bbls. per day to 113 bbls. per day.

B. Minimum Cost

1. Sub-surface equipment—Needless extra expense for tubing can be avoided by careful joint making-up; as a tight joint, unless badly worn, will not leak and be cut out under load. Rod-type pumps that are run and pulled on the rods usually eliminate expense of pulling tubing for pump servicing, and should be used wherever capacity permits. As discussed in the first section, the smaller rod type may give greater displacement under some conditions than the larger tubing type. Where wear of plunger and barrel is rapid with usual types, an improvement in service will ordinarily be secured by replacement with hardened liners and plunger.

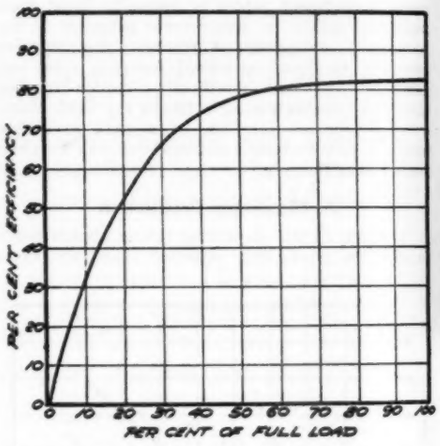

Fig. 5—Twenty horsepower side of 20/50 electric motor; efficiency vs. load

Some special pumping installations, such as the hydraulic pump, are in use; but the majority of pumping wells are sucker-rod operated. Strength of rods, both in joints and body, affects economy as well as capacity. A.P.I. standards[2] have resulted in interchangeability between some makes—and, equally important, have resulted in better making-up of rods of the same make. Adhering to the A.P.I. Code on Care and Use of Sucker Rods[3] aids in prolonging life of rods and keeping costs down. Two wells of the same depth rarely have the same load, so that comparisons of life of two different makes of rods in wells pumping from the same sand are usually of no value. True comparisons can be secured by installation in a well that imposes severe service of a rod string composed of a single rod of one make followed by a single rod of a second make, and with the second make followed by the first make, and so on for the entire string. Weighing of wells and correlating loads with failure records have established fairly well the fatigue limits of present rods. If maximum loads are kept below about 27,000 pounds

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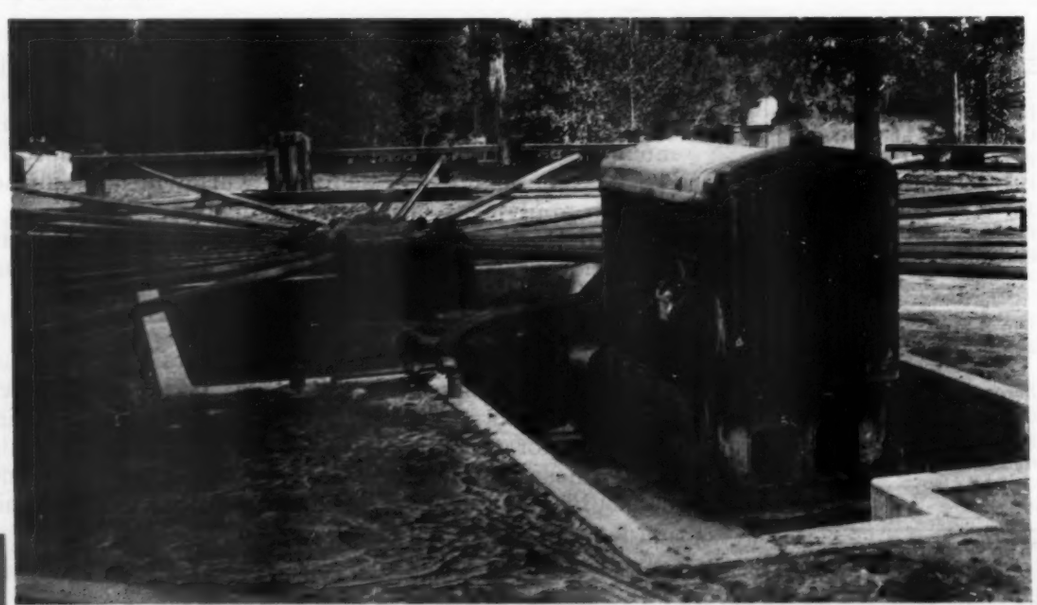

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per square inch, rods seldom fail. For badly corrosive conditions, however, this limit must be greatly reduced. A load of 27,000 pounds per square inch is equivalent to 8,300 pounds for five-eighths inch rods, 12,000 pounds for three-fourths inch rods, and 16,300 pounds for seven-eighths inch rods. Wells can be pumped with rod loads in excess of this amount, but failures will be inevitable. Rods do not fail because of loading to their ultimate strength, but because of continuously repeated loadings above the fatigue limit. Extensive laboratory experiments on fatigue have been applied to sucker rods, and the late Louis F. Merrill indicated that range of stress was almost as important as maximum stress; i.e., the greater the range, the lower the fatigue limit. Values given by him for rod steel of 60,000 pounds yield strength for operation with large pumps at high speed, so that minimum loads are practically zero, are as follows: seven-eighths-inch rods, 12,300 pounds; three-fourths-inch rods, 9,000 pounds; and five-eighths-inch rods, 6,200 pounds. A general rule to follow is to keep loads within the fatigue limit —and, if this is not practicable because of loss of production, to keep them as low as is possible. Records on a large number of rod failures indicate that cost of rod displacement is only about 16 per cent of the total cost of putting the well back on the pump, exclusive of lost production. As most rod failures occur in the top 1,000 feet of string, the cost will be about the same for each job—regardless of the depth of the well. Also, one rod break tends to produce a second, as dropping of rods will kink these below and hasten failures. Tubing of the 2½-inch size tends to damp rod vibration and reduce peak loads usually found in pumping through 3-inch tubing. Peak loads sometimes may be reduced by changes in pumping speed so small that pump displacement is hardly affected. Good counter balancing, which tends to produce a more uniform speed, will reduce loads by eliminating the whip which accompanies pumping with a drilling motion.

In addition to the above refinements, a good formula for low rod loads and, consequently, long life is as follows: Use the longest practical stroke to permit use of the smallest pump and the slowest speed that will get the production.

Pumping Unit

2. Surface Equipment—The pumping machine should be adequate in strength for the job, so that it is not over-loaded; otherwise failure will result, and replacement will be expensive. On the contrary, it should not be unnecessarily large, as first cost will be excessive. The new American Gear Manufacturers Association's rating form, which is still undergoing some final changes and parts of which the American Petroleum Institute has tentatively accepted, will be of great value in protection of both manufacturer and operator, as it will facilitate selection of equipment suited to the particular job.

In order to secure good pump volumetric efficiency throughout the life of the well, pumping installations should be so designed that progressive changes in speed can be made with a minimum of expense and trouble. Double-reduction gears have been extensively used for this purpose. Speed ranges from 24 strokes per minute down to less than 2 strokes per minute can be provided by changing V-belt drive ratios from one-to-one to seven-to-one, and by varying the speed of the prime mover from 1,200 r.p.m. to 600 r.p.m.

Power Input

3. Power—Power input to a rig is about proportional to the pump displacement—regardless of the amount of oil pumped; and, therefore, volumetric efficiency of the pump should be kept high. Below-ground power efficiency, even with no excess pump displacement, averages only about 50 per cent. Standard rig efficiencies reach a maximum of about 78 to 80 per cent, but only when heavily loaded. Motor efficiencies and, therefore, power inputs vary considerably with amount of counterbalance, as shown by the following example on a Buckbee Zone well at Santa Fe Springs: Fourth hole pumping with correct counterbalance was changed to third hole. Before counterbalance was adjusted for the new condition, power input to motor was 14.6 horsepower, and after changing was reduced to 11.2 horsepower.

New pumping installations are being powered with either electric motors or multi-cylinder gas engines. The durability and small maintenance cost of electric motors are well known. Multi-cylinder engines are newer, and representative maintenance costs as well as length of life are not so definitely known—although some engines have had continuous service for three years and still appear to be in good condition. It is important that the prime mover should be of the right size. Figure 5 shows the efficiency curve of an electric motor. It is to be noted that, at higher loads, the motor is most efficient; that efficiency is reduced slowly with first reductions in load but that with smaller loads the efficiency drops off very rapidly. A substantial saving will usually be made when the load falls to the low-efficiency range to replace the large motor with a smaller one. Size of gas engine in relation to its load is also important, but for another reason. Moderate loading will greatly increase its life over full-load operation, and also result in economy in fuel. Amount of gas used is not as important with engine operation as is amount of electric energy for a motor, due to the great difference in cost. Table 2 shows the difference in cost of gas and electric energy, and with estimated efficiencies the cost per month per brake horsepower. Assuming at a certain lease that gas is worth 6 cents per 1,000 feet, and that electricity can be furnished for an average cost of 1 cent per kwh., a 20 horsepower load will cost $176 per year for gas and $1,517 per year for electricity. Use of gas will allow $491 to be applied on maintenance and operating profit each year, while permitting the junking of an $850-engine annually if it is completely worn out.

Bibliography

[1] Univ. Wis. Bull. Serial No. 1265, 41.
[2] A.P.I. Standards No. 11-B: "Sucker Rod Specifications."

World Petroleum Congress, 1937

An invitation from the Association Francaise des Techniciens du Petrole, of which Col. Louis Pineau is honorary president and M. Charles Bihoreau is president, to hold the World Petroleum Congress, second session, in Paris in June or July, 1937, the date of the Exposition Internationale being organized by the French Government, has been accepted by the councile of the Institution of Petroleum Technologists, London.

Gas Company Sold

LITTLE ROCK, Ark., Nov. 11.—The Natural Gas & Fuel Co. has been sold to the Community Natural Gas Co. of Dallas for $56,000.

TABLE 2—COST OF GAS AND ELECTRIC ENERGY

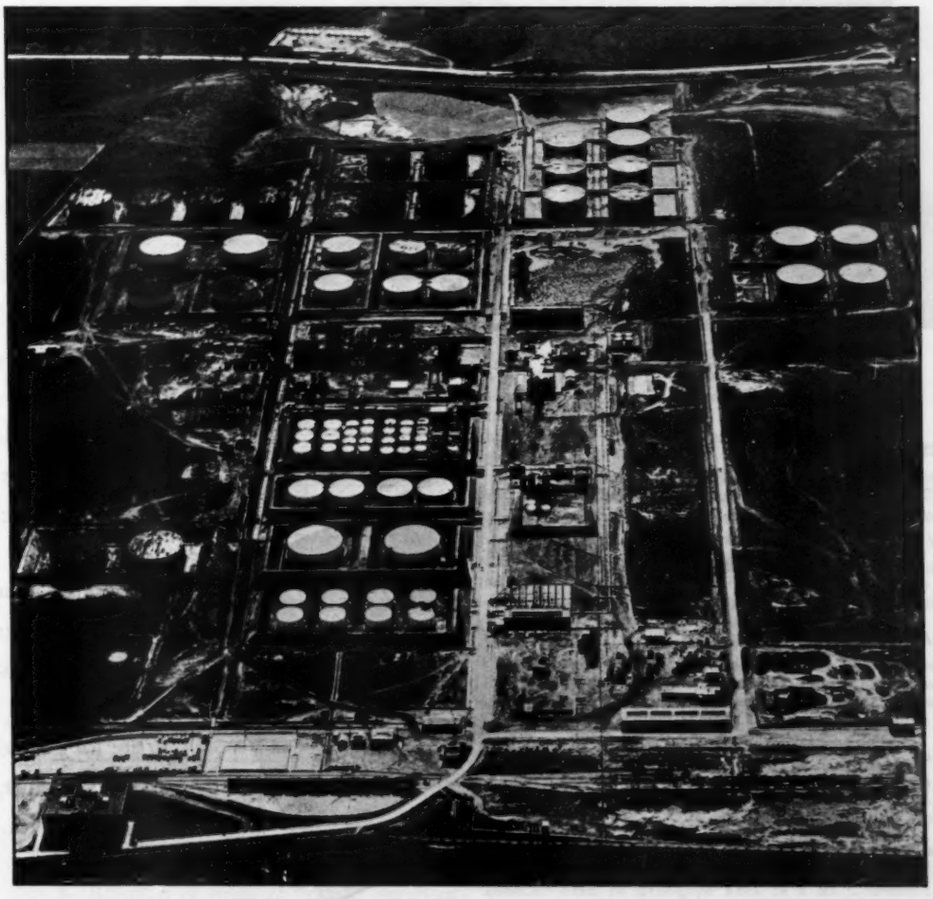
A.—Ratio of electric and gas energy—

Cost of electricity per kwh. (Cents)	Cost of gas per 1,000 cu. ft. (1,000 B.t.u. per cu. ft.) 5 cents	8 cents	10 cents	15 cents	20 cents	25 cents	100 cents
1.0	58.5	36.6	29.2	19.5	14.6	11.7	2.9
2.0	117.0	73.2	58.5	39.0	29.2	23.4	5.8
3.0	176.0	110.0	87.7	58.5	43.8	35.1	8.7
5.0	293.0	183.00	146.0	97.6	73.0	58.5	14.5
8.0	468.0	293.0	234.0	156.0	117.0	93.7	23.2

Note: Electric energy costs more than gas energy by the factors given. Cost of developed power depends upon efficiency of conversions, which is greater for electric motors than for engines (see schedule "B" hereinafter).

B.—Costs of brake horsepower—

Cost of electricity per kwh	0.75	1.00	1.50	2.00	3.00
Electricity for motor per month (assumed efficiency, 85 per cent)	$4.75	$6.32	$9.50	$12.65	$19.00
Cost of gas per 1,000 cubic feet (assumed heat value, 1,000 B.t.u. per cu. ft.)	.05	.08	.10	.15	.35
Gas for gas engine per month (assumed efficiency, 15 per cent)	$0.61	$0.98	$1.12	$1.84	$4.29



Aerial view of Union Oil Company's Wilmington refinery near Los Angeles harbor

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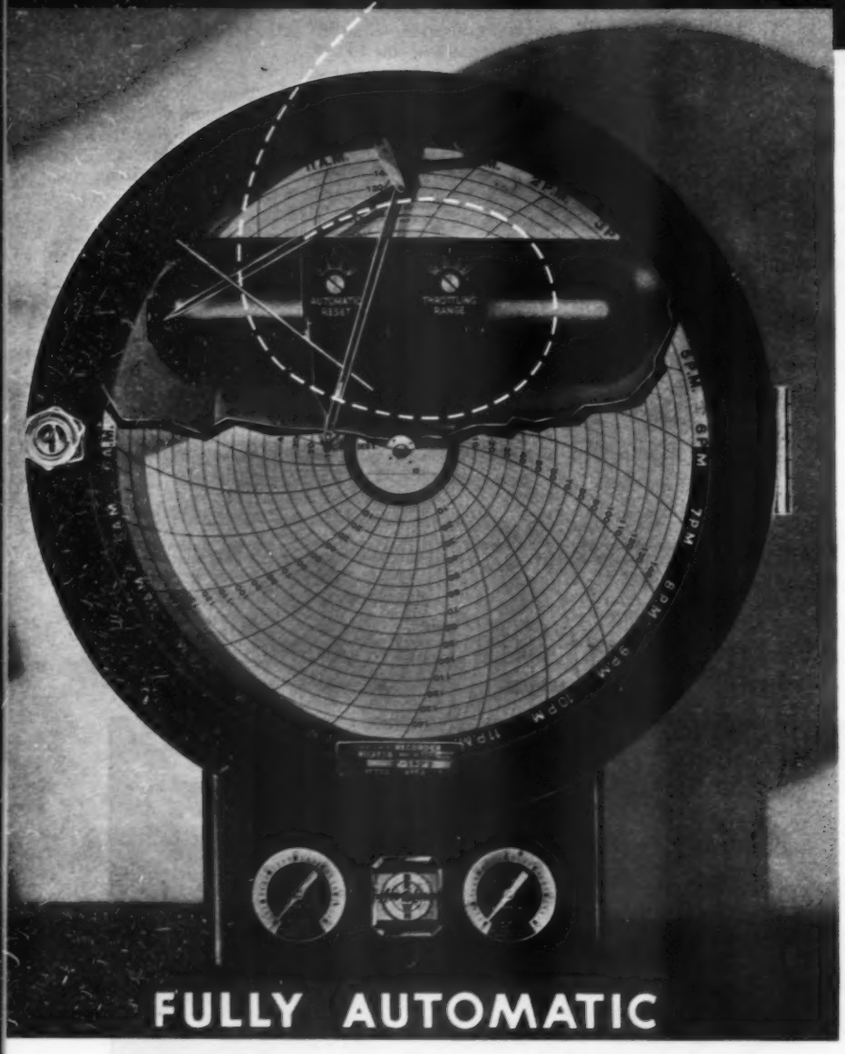

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Mud Resistance Is Cut by Substituting Full-Hole Tool Joints for Regular

By R. A. MARCH and W. E. GILBERT
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A.P.I.—Effects on the fluid-circulating systems of drilling wells produced by substituting full-hole for regular tool joints are discussed by the authors. Results show that resistances may be materially reduced, pumping pressures and power costs lowered, and circulation

The full-hole joint has been, in general, accepted by the industry as an improvement over the regular joint, and its future use is apparently assured. However, some of the advantages ascribed to the full-hole joint have been accepted either on the basis of theoretical considerations or on the basis of limited tests, and more definite information is desirable for determining the actual economies which may be realized. This is particularly true regarding differences in rates of flow and pumping pressures effected by using full-hole joints, and regarding corollary effects on drilling rates and costs. The purpose of this paper is to present the results of tests conducted to obtain comparable flow data under average field conditions which, it is hoped, will be of value to others in determining policies of tool-joint replacement during the transition period while stocks of regular joints are still available at lower cost than full-hole joints.

Test Conditions

In obtaining data for both the full-hole and regular tool joints of 4½- and 5⅞-inch size, the procedure was simply to gauge rates of flow and record pump pressures at several depths, with each of the four drilling strings used. For brevity, the test conditions are summarized in Table 1.

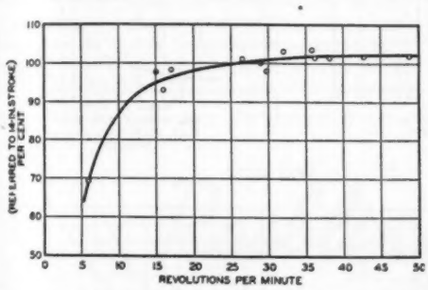

Fig. 1—Relation of volumetric efficiency to pump speed, 14"x7¼"x14" slush pump

In testing the 4½-inch drill pipe, the string was first run in the hole to 6,014 feet of depth and the maximum rate of flow was maintained for 20 minutes, during which time mud pressures were recorded, pump strokes counted, and gauges taken of the quantity of mud pumped. Observations were also made of the unit weight of the mud, and of its viscosity in centipoises as determined by use of a Stormer viscosimeter run at a constant cup speed of 600 r.p.m. Three other 20-minute runs were made at this depth with pumping rates successively decreased until the fourth run, at minimum rate, was completed. The bit was then raised to depths of 4,007 feet and 1,986 feet, and the same procedure repeated. Finally, a run was made with the drill collar directly connected to the kelly. The string of drill pipe with full-hole joints was then set back into the derrick, and a similar series of observations was made using a 4½-inch drill pipe equipped with regular joints. The same bit and the same drill collar were used in testing the two strings. Testing of the 5⅞-inch drilling strings was carried out in the same manner, care being observed in duplicating conditions.

Measurements also were made of the length of pump stroke for each rate of flow, and by this means tank-gauge readings for each 20-minute interval were checked against rates determined by corrected pump-stroke readings. An example of the volumetric efficiencies is shown in Figure 1 as a matter of incidental interest. These abnormally-high volumetric pump efficiencies are attributed to pressure on the pump suction, the fluid level in the suction pit at each of the two wells being approximately 2 feet above the pump cylinders. The pressure-recording gauge used at the two wells was calibrated before and after use, and all pressure readings were adjusted in conformance with the calibration curves obtained.

The data for the two strings of 4½-inch drill pipe are shown at A and B, and for the two strings of 5⅞-inch drill pipe at C and D in Figure 2. Curves 1, 2, and 3 show pressures and rates of flow obtained at the depths indicated, and curves 4 show the data obtained by circulating fluid through only the surface connections, the drill collar, and the bit. Curves 5, which represent the relation between pressure losses per 1,000 feet of depth and rates of flow, were obtained by subtracting the loss of pressure through the surface equipment, drill collar, and bit from the total pressure for each rate of flow and dividing the remainder by the depth in thousands of feet. These curves were thus derived on the assumption that losses in the drill pipe and in the annular return circuit are proportional to depth. In making this assumption, temperature and static-pressure effects on the fluid were neglected, as were differences in fluid friction and differences in the diameters of the cased and open hole. However, for practical purposes of comparing the merits of full-hole and regular joints, the assumption is valid.

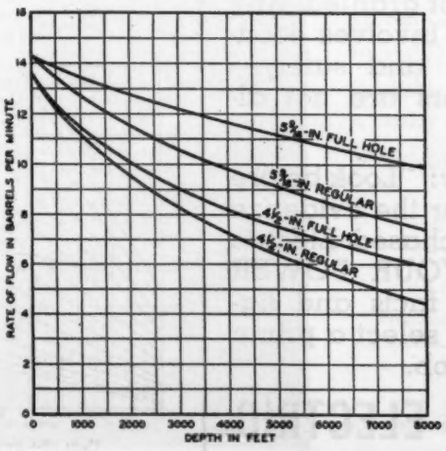

Fig. 4—Relation of rates of flow to depth at maximum pumping capacity

If the mud fluid were a true liquid, curves 5 in Figure 2 would be expected to be straight lines; but, since mud fluids exhibit thixotropic characteristics, their fluidity varies with turbulence—which is sufficient to explain the curved nature of these lines. Herrick's[1*] empirical formulas, for the flow of California muds, give curves which are similar to those shown; but any close check is rendered impracticable by lack of suitable length equivalents for the annular circuits and for the full-hole joints. Indications are that the Herrick formulas would give considerably higher pressures than those encountered in the test data presented.

The relationship between rates of flow and maximum pumping pressures, using a single pump, is represented in Figure 2 by curves 6-a and 6-b for the two wells. This relationship is affected only by the design and condition of the pump, the size of liners, and the steam supply. At well No. 36, 200-pound saturated steam was used; and the steam for well No. 85 was generated at 150 pounds per square inch, with about 15 degrees of super-heat available at the rig. The greater pressure developed by the pump at well No. 36 for the same rates of flow with full throttle, as indicated by curves 6-a and 6-b, were thus due to the higher boiler pressure used.

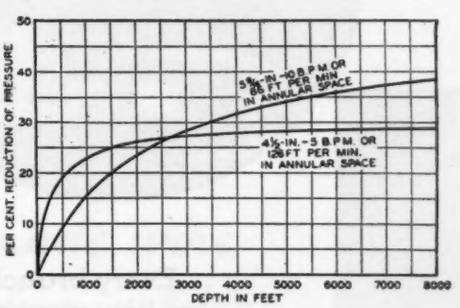
PER CENT. REDUCTION OF PRESSURE
DEPTH IN FEET
5⅞-IN.-10.8 P.M. OR 85 FT. PER MIN. IN ANNULAR SPACE
4½-IN.-5 B.P.M. OR 126 FT. PER MIN. IN ANNULAR SPACE

Fig. 5—Reduction of pressure at constant flow resulting from use of full-hole tool joints

The relation of rates of flow to pressure and depth, under the test conditions, is shown at A, B, C, and D in Figure 3. Each of these graphs is based upon corresponding data from curves 4 and 5 of Figure 2, and in each graph is also shown in the maximum capacity as represented by curves 6-a and 6-b.

For example, referring first to A in Figure 3, the maximum rate of flow attainable at 7,000 feet of depth with 4½-inch regular tool joints is found to be 5 bbls. per minute. At the same depth, as shown at B in Figure 3, approximately 6.4 bbls. per minute can be circulated—using full-hole joints.

The rates of flow obtainable with wide-open throttle are shown plotted against depth in Figure 4, and the advantage in extending the depth limitations of existing pumping equipment by use of full-hole joints is indicated in Table 2—the data of which were obtained from Figure 4.

The comparisons given in Table 2 show that increases in pumping-depth range, resulting from substitution of full-hole joints, are considerably greater for the 5⅞-inch size than for 4½-inch size. Test information is not available regarding the relation of pressure losses in the drill pipe to pressure losses in the annular-return circuit. However, it is obvious that when the ratio of annular area to drill-pipe area is 5 to 1, instead

*Delivered at Los Angeles meeting, American Petroleum Institute. Authors' title: "Resistance of Mud Through Regular Vs. Full-Hole Tool Joints."

*Figures refer to bibliography.

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of 2.8 to 1, the loss inside the drill pipe will be a larger part of the total pressure loss—and, consequently, reduction of the loss inside the drill

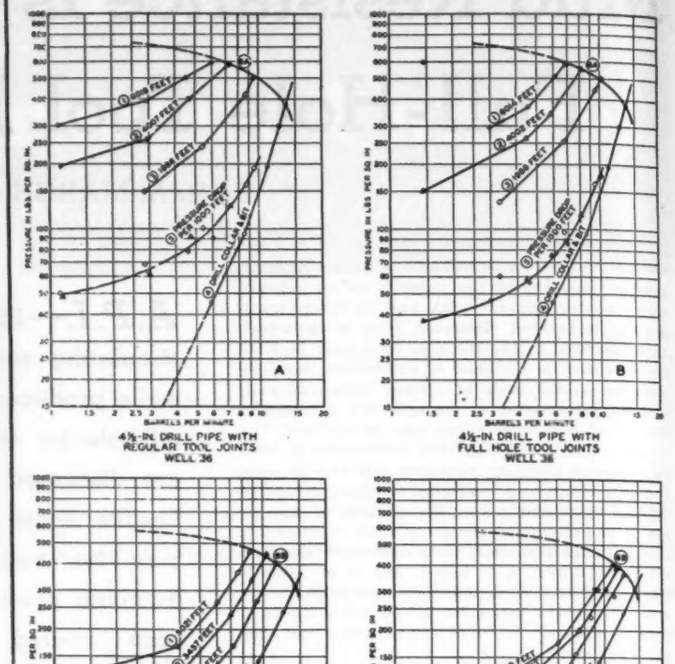
4½-IN. DRILL PIPE WITH REGULAR TOOL JOINTS WELL 36
4½-IN. DRILL PIPE WITH FULL HOLE TOOL JOINTS WELL 36
5⅝-IN. DRILL PIPE WITH REGULAR TOOL JOINTS WELL 85
5⅝-IN. DRILL PIPE WITH FULL HOLE TOOL JOINTS WELL 85

Fig. 2—Test data

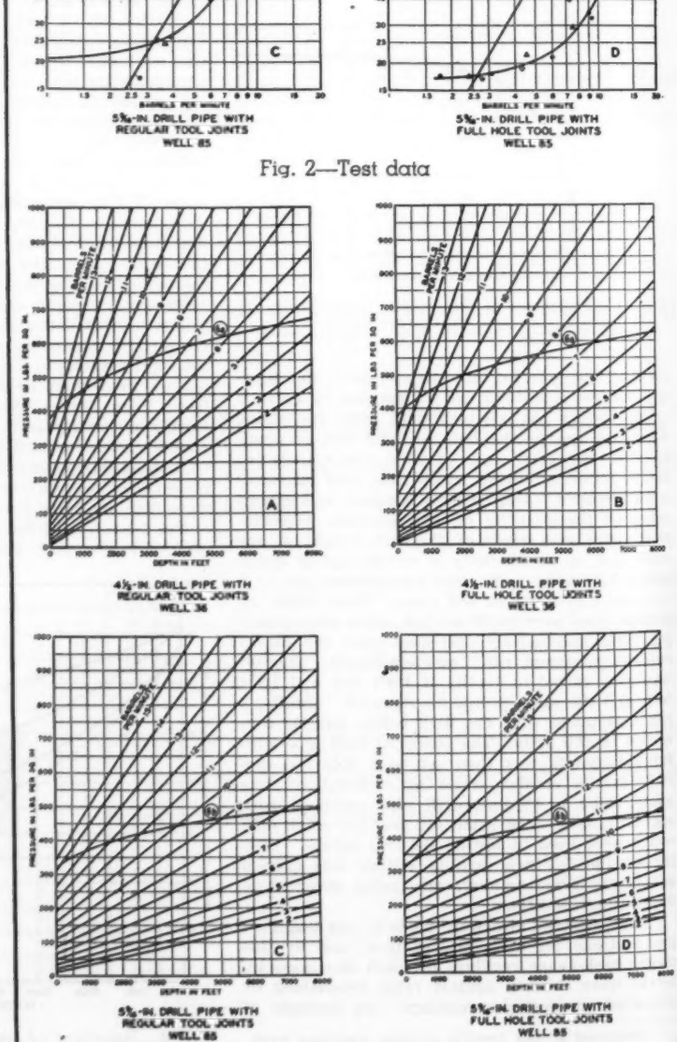
4½-IN. DRILL PIPE WITH REGULAR TOOL JOINTS WELL 36
4½-IN. DRILL PIPE WITH FULL HOLE TOOL JOINTS WELL 36
5⅝-IN. DRILL PIPE WITH REGULAR TOOL JOINTS WELL 85
5⅝-IN. DRILL PIPE WITH FULL HOLE TOOL JOINTS WELL 85

Fig. 3—Relation of rates of flow to pressure and depth

pipe will have a greater effect in reducing the total pressure required to maintain a given rate of circulation.

Comparisons of pressure required to maintain a constant rate of flow for various depths may be made by inspection of Figure 3. However, for convenience, the reduction in pressure obtained by using full-hole instead of regular joints is shown, for representative rates of flow, in Figure 5. From Figure 5 it will be seen that, if it were desirable and practicable to maintain a uniform rate of flow, the pressure required could be reduced as much as 38 per cent for the 5⅞-inch size and as much as 28 per cent for the 4½-inch size by using full-hole tool joints. As the power requirement is proportional to the pressure for a given rate of flow, corresponding reductions in the cost of power could be effected. However, the present tendency is to increase circulation rates; and there can be no doubt that, in certain areas at least—and particularly in drilling loosely-consolidated formations—high rates of circulation are more advantageous than savings to be effected in power costs by minimizing the circulation.

On the basis of Figure 4, the maximum rate of flow at 8,000 feet of depth may be increased about 34 per cent in the 4½-inch size and the same percentage in the 5⅞-inch size by substitution of full-hole joints. Perhaps the most important result of using full-hole tool joints, however, lies in the practicability of increasing the circulating depth range of existing pumping equipment. As shown in Table 2, 10 bbls. per minute can be circulated by one pump, with the bit at 7,680 feet of depth, using 5⅞-inch full-hole joints; whereas the maximum depth at which this rate may be maintained using regular tool joints is only 3,680 feet. Similarly, 6 bbls. per minute can be circulated at 7,800 feet of depth using 4½-inch full-hole joints, while this rate may be maintained only to 5,550 feet of depth using regular tool joints.

In closing, it is desired to suggest that control of the kinetic energy released through the bit is a matter worthy of careful consideration in the further development of efficient circulating systems for drilling wells. In the absence of test data, it is possible that a brief reference to the hydraulic principles involved may serve to stimulate the attention which this factor appears to deserve. The power available for jetting action at the bit is a direct function of the velocity head produced in the circulation passages of the bit, and is approximately represented by the following equation:

$$HP_j = 0.000478 \frac{WB^2}{A^2}$$

in which W is the weight of mud per cubic foot, B is the rate of flow in barrels per minute, and A is the total cross-sectional nozzle area of the bit in square inches. The form of this equation indicates that jetting action may be increased either by increasing rates of flow or by decreasing the total nozzle area. Within reasonable limits, the latter would appear to offer the advantage of securing the required jetting action without increasing friction losses in other parts of the fluid circuit.

TABLE 1—SUMMARY OF TEST CONDITIONS

No.	Item—	4½-in. drill pipe with: Regular tool joints	4½-in. drill pipe with: Full-hole tool joints	5 9/16-in. drill pipe with: Regular tool joints	5 9/16-in. drill pipe with: Full-hole tool joints
1.	Location	Well 36		Well 85	
2.	Inside diameter of tool joint, in.	2¼	*3	2¾	*4½
3.	Drill-pipe weight, lb. per ft.	16.6		22.3	
4.	Drill-pipe lengths tested, ft.	6,019 4,007 1,986	6,014 4,002 1,986 †0	5,921 3,457 1,898	5,909 3,456 1,576 †0
5.	Minimum number of runs at each depth	4		4	
6.	Depth of bottom of casing, ft.	5,672		916	
7.	Drill-pipe protectors per stand in cased hole	2		2	
8.	Size of casing, in.	8⅝		13⅜	
9.	Size of open hole, in.	7⅞		12¼	
10.	Make, type, and size of bit	A		B	
11.	Size of drill collar	28-ft. by 3-in. bore		28-ft. by 2¾-in bore	
12.	Ratio of annular area to drill-pipe area	2.8 (in casing)		5.0 (in open hole)	
13.	Velocity in annular circuit equivalent to 1 bbl. per min.	25.1 ft. per min. (in casing)		8.64 ft. per min. (in open hole)	
14.	Mud weight, lb. per cu. ft.	77 to 78		78 to 81.5	
15.	Apparent viscosity of mud in centipoises (determined with Stormer viscosimeter at cup speed of 600 r.p.m.)	23 to 40		24 to 40.5	
16.	Approximate shear value of mud, lb. per sq. ft. (determined with Stormer viscosimeter at various rates of shear)	0.068 to 0.072		0.072 to 0.084	
17.	Size of pump, in.	14×7¼×14		14×7¼×14	
18.	Diameter of pump liners, in.	7¼		7¼	

*Optional A.P.I. standard. †Only drill collar and bit were connected below the kelly.

TABLE 2—COMPARISON OF MAXIMUM PUMPING DEPTHS USING ONE 14"x7¼"x14" DUPLEX SLUSH PUMP

Rate of flow in barrels per minute	Maximum depth in feet at which rate of flow may be maintained: 4½-in. drill pipe, Regular tool joints	4½-in. drill pipe, Full-hole tool joints	5 9/16-in. drill pipe, Regular tool joints	5 9/16-in. drill pipe, Full-hole tool joints
6	5,500	7,880	....	....
7	4,260	5,900	....	....
8	3,230	4,270	....	....
9	2,410	3,070	5,140	10,250
10	1,700	2,080	3,680	7,680
11	1,100	1,290	2,530	5,370
12	610	680	1,570	3,390
13	....	....	800	1,640
14	....	....	160	320

Bibliography

[1]H. N. Herrick, "Flow of Drilling Mud," Petroleum Development and Technology, Am. Inst. Mining Eng., 476 (1932).

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Characteristics of Internal Combustion Engines Using Butane-Air Mixtures

By C. J. VOGT
University of California*

***A.P.I.*—Results of an engine-test program answering many questions relative to the relation between independent variables and operating characteristics of internal-combustion engines are given by the author. Economical utilization of fuel may be secured through a thorough understanding of this.**

Literature presents a wealth of information relative to the operating characteristics of internal-combustion engines. One can find articles explaining the influence of any desired variable, in design or operation, on engine economy and output. Since these various tests are not performed under similar conditions, or on similar equipment, and since the conditions of test are not always fully stated, it becomes difficult at times to correlate the results. Hence, if one is aware of the relation a given variable has to another, one is still at a loss in many instances as to what the results might have been if a third, fourth, or nth variable had been considered. In order more definitely to establish the inter-relation of the many variables to be given consideration, an engine-test program was established, in the spring of 1932, in the Department of Mechanical Engineering at the University of California at Berkeley. This program is to cover as completely as possible the many operating characteristics, fundamental design characteristics, the advantages of various fuels, and particularly the relation of one to the other. In order satisfactorily to correlate the data obtained from engine tests, it is necessary to conduct all experiments on one piece of equipment, and thus eliminate such variables as may enter due to design, e.g., the induction system.

Laboratory Equipment

The experimental station (Figure 1) consists of a single-cylinder variable-compression engine with a 3⅞-inch bore and 4½-inch stroke. The compression ratio can be varied between the limits of 3.5 to 8.7. The exhaust and intake cams are so arranged on the camshaft that it is possible to vary their settings independently. During the present tests the valve timing is as follows:

Intake opens 8 degrees after top dead center.

Intake closes 44 degrees after bottom dead center.

Exhaust opens 43 degrees before bottom dead center.

Exhaust closes 6 degrees before top dead center.

The ignition system on the engine is so designed that on the exhaust stroke a spark passes between a pointer and a scale graduated in "degrees before and after top dead center," from which the spark timing on the compression stroke may accurately be ascertained. The cooling system is a self-contained unit in which distilled water is circulated from the cylinder jacket through a condenser cooled with tap water. In this way possible deposits in the water jacket are reduced to a minimum. The rate of water flow is closely regulated with a micrometer valve. Water temperatures are read on thermometers on the intake and discharge sides of the water jacket. Electric heating coils for the mixture are mounted on the intake manifold between the carburetor and the engine.

The engine is loaded with a five horsepower shunt generator mounted on bearing pedestals. The rotation of the field frame is constrained by an arm connected to a torsion balance from which the load may be determined to within 0.01 pound. The load is controlled with heating elements which may be switched into the armature circuit in combinations ranging from 1 to 20, while close adjustments of speed are made with a field rheostat.

The air taken into the engine is drawn through a 0.462-inch diameter bell-mouthed orifice in one end of a 60-gallon drum used as a surge tank, the other end of which is covered with an elk skin to reduce pressure variations. The drop of pressure across the orifice is measured with a slant-tube manometer using water as an indicating medium. Knowing the pressure drop across the orifice, the atmospheric temperature, barometric pressure, and humidity, the weight of air admitted to the engine in unit time may be determined.

The gasoline-fuel system consists of two metal containers connected by a two-way stop-cock to a graduated pipette, so that the rate of fuel flow to the carburetor may be timed and the weight of fuel consumed per unit of time calculated. In order to eliminate the use of two induction systems when using gaseous fuels and liquid fuels, respectively, a line for the liquid fuels is led from the needle valve of a 1¼-inch Schebler carburetor to the venturi of the carburetor for gaseous fuels—thus permitting the use of one induction system for all fuels, and eliminating one variable when comparing fuels.

The liquefied gaseous fuels are led from the storage tanks (at left, Figure 1) through a pressure-reducing valve to a heater, so that better temperature control of the fuel is obtained than if the hot water were taken from the water jacket of the engine. From the heater the fuel passes through a liquid trap, and through a pressure regulator. A system of valves permits use of any one of the various pressure regulators mounted on the panel. From the pressure regulator the gaseous fuel passes through a five-light gas meter calibrated to 0.01 cu ft., then to a 30-gallon drum which serves as a surge chamber for the fuel before it enters the carburetor. Pressures in the fuel system are measured on the low-pressure side of the fuel regulator, in the surge tank, and in the intake manifold where it attaches to the engine. The later pressure is measured with a mercury manometer, which is connected to the intake manifold with a line containing two light check valves—thus permitting the determination of the maximum manifold depression. Temperatures of the water entering and leaving the fuel heater, of the fuel at three points between the heater and the engine, of the intake and exhaust mixtures, the crankcase oil, and the atmosphere are measured.

A sampling tank is connected to the exhaust line for obtaining samples of the exhaust gases for analysis with an Orsat apparatus.

All tests are scheduled in such manner that all but one of the independent variables are accurately controlled. The independent variables are compression ratio, throttle position, cooling-water temperature, mixture ratio, mixture temperature, spark setting, and engine speed. In order to obtain the steady-state temperature distribution throughout the engine, it has been found necessary to operate the engine for at least 1½ hours before observations are begun. For the

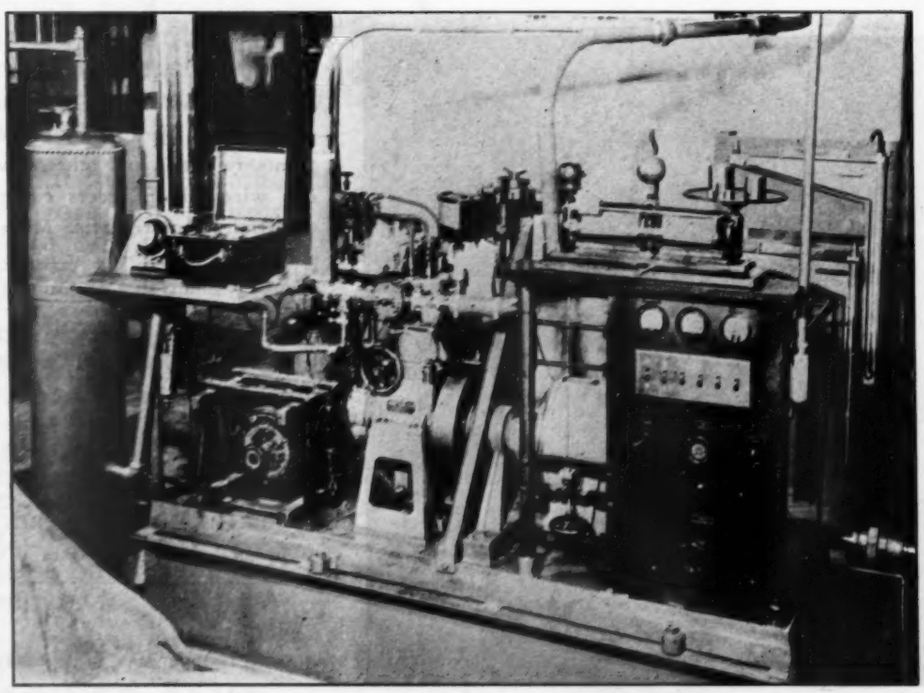

Fig. 1—Variable compression engine equipped to use butane, natural gas or gasoline

*Delivered at Los Angeles meeting, American Petroleum Institute. Author's title, "Some Characteristics of Internal-Combustion Engines When Operating with Butane-Air Mixtures."

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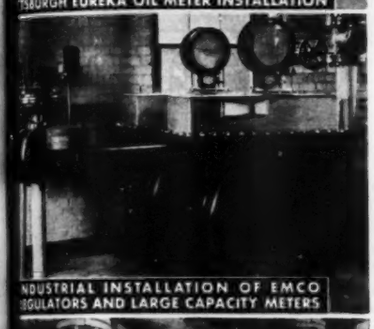

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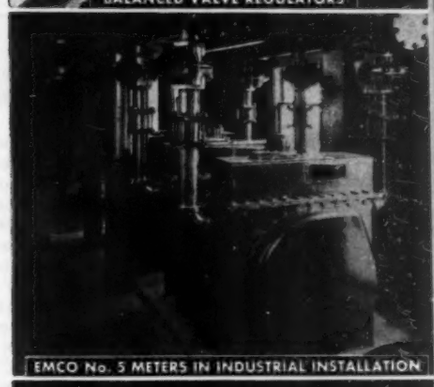

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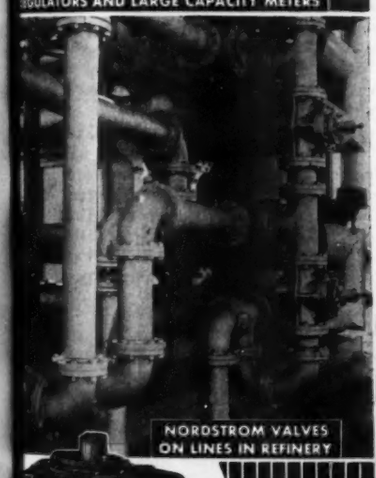

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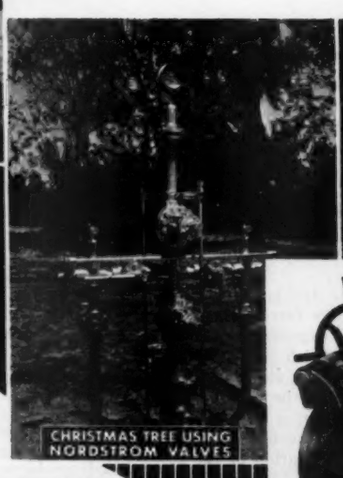

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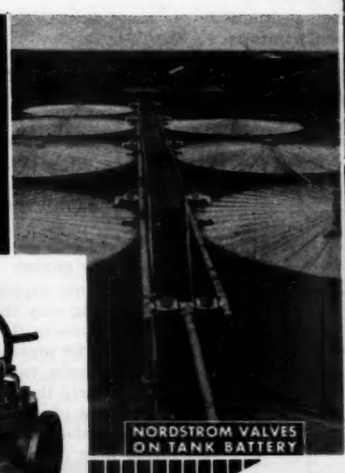

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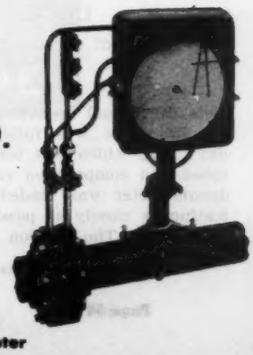

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period of operation preliminary to the recording of data, a Midgley indicator is used for the adjustment of the carburetor. No results are recorded from the indicator, since it is realized that even with the most accurate indicating system it is doubtful whether the results are of any practical value when accurate data are sought.[1a] In order to hold conditions as closely in a state of equilibrium as possible when a test is in progress, the variables most easily controlled are maintained constant. For instance, the spark adjustment once set will not vary

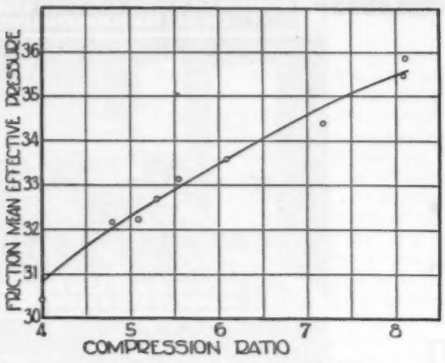


Fig. 2—Variation in friction losses as a function of compression ratio

to any extent with adjustments in other variables. Therefore, for a given speed, spark setting, throttle position, and operating temperature, the mixture was varied for the range of combustibility. This procedure was followed for the various spark settings, compression ratios, and speeds at which the engine was operated. In order to check the condition of the engine, repeat tests were made and compared with results shortly after the engine was overhauled and tuned. These tests included runs of compression pressures as a function of speed and compression ratio. With this procedure it was found that cross-plots of the data would permit the separation of the variables and yield gratifying results.

The crankcase oil is changed approximately every 100 hours of engine operation, and analyzed for characteristics which might be related to the particular fuel which has been used during that period.

When operating at part-throttle conditions it has been found desirable, in order to obtain accurate adjustment, to refer all throttle positions to the pressure drop in the air across the intake orifice. The results from such tests are then referred to the quantity of air taken into the engine per hour, rather than to throttle position.

In order to determine the friction horsepower by motoring the engine and yet obtain the results at conditions simulating as closely as pos-

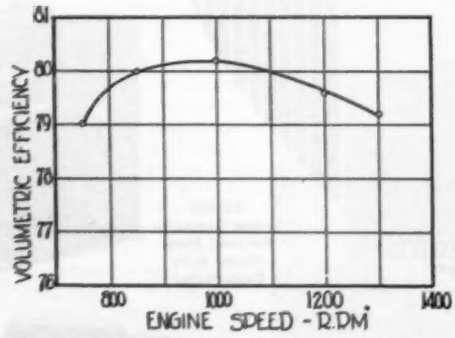


Fig. 3—Effect of valve timing on volumetric efficiency

sible the actual operating conditions, the following procedure was followed: At the end of a day's run, which had been conducted at a given speed and compression ratio, the balance on the dynamometer was loaded with weights approximating as closely as possible the friction load of the engine. The ignition circuit was then opened and the generator thrown over to the motor circuit. In this manner it was possible to obtain the engine-friction load before any appreciable change in operating conditions could be effected.

[1a]Figures refer to bibliography.

Test Results

Since it is impossible to present in a paper of this type all of the data obtained, only such have been chosen which will indicate the effect of certain of the independent variables and some results obtained when operating with butane-air mixtures.

Friction Mean Effective Pressure

The data for the friction mean effective pressure (Figure 2) were obtained at various times when the engine was shut down, thus insuring operating conditions at the instant of test. These results are at a speed of 1,000 r.p.m., cooling-water temperature of 180° F., and at the compression ratios indicated. A definite decrease in the rate of change of friction mean effective pressure with increase in compression ratio is noted. This fact has also been indicated by other experimenters,[2] and may be explained as a phenomenon of lubrication and the reaction between the cylinder wall and piston. The reaction of the cylinder wall on the piston is expressed by:

$$F = (m\omega^2 n^2 A_n \cos n\theta + P) \tan \phi \qquad (1)$$

where:

F = the reaction between the cylinder wall and piston, in pounds.

m = the mass of the reciprocating parts.

ω = the angular velocity of the crank.

n = the harmonic of the inertia force under consideration.

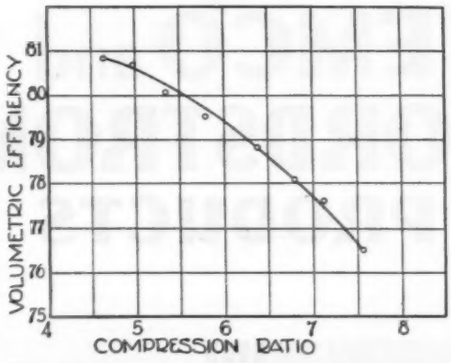


Fig. 4—Effect of compression ratio on volumetric efficiency

A = a constant, dependent upon the crank length and connecting-rod length.

θ = the angle between the crank and center line of the engine at the instant considered.

P = the total pressure acting downward on the piston.

ϕ = angle between the connecting rod and center line of the engine.

Applying this expression to the case at hand, and considering only the average force F over the stroke, all values in the above expression are constant except the pressure, P, which is a function of the compression ratio. However, since P varies as approximately the 1.3 power of the compression ratio, the rate of change of friction mean effective pressure should increase with compression ratio rather than decrease. The variation of the coefficient of friction μ with the criterion $\frac{ZN}{p}$ is well known. Applying this to the case under consideration where the speed is constant, the variables, Z, the viscosity of the oil at operating temperature and the unit load, p, the reaction between the cylinder wall and the piston, need only be considered. A decrease in the ratio $\frac{Z}{p}$ reduces the coefficient of friction μ until solid friction obtains. As the compression ratio is increased, the pressure, p, likewise increases and decreases the film thickness and, thereby, the coefficient of friction.[3] The viscosity is decreased at the higher compression ratios due to the increase in the gas-film-transfer factor which permits an increase in the rate of heat flow to the oil film. The film-transfer factor is given by:[4]

$$f_t = 0.0277\sqrt[3]{P^2T}\,(1+0.0063w)\ \text{B.t.u./°F./Ft}^2\text{/hr.} \qquad (2)$$

where:

P = the gas pressure in the cylinder, pound per square inch, absolute.

T = the absolute temperature.

w = mean piston speed, feet per minute.

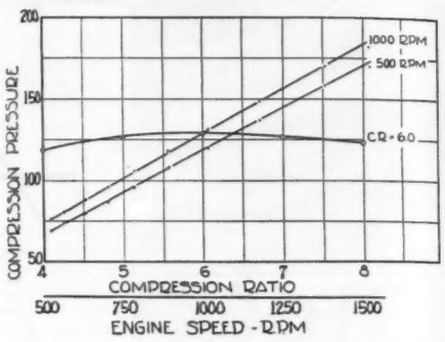


Fig. 5—Compression pressures as a function of compression ratio and engine speed

It is to be noted in this relation that the gas-film-transfer factor depends more on the pressure than on the temperature, although an increase in either variable tends to increase the final result. The piston velocity, w, is constant, and does not enter the problem under consideration. The heat interchanges are periodic. The temperature variations on the water side of the cylinder have been found to be negligible[5] due to the fact that the film resistance on the water side is not appreciably reduced with the small increase in the average rate of heat flow to the water with increase in compression ratio.

When motoring the engine until steady-state temperature distribution was obtained, it was found that the friction mean effective pressure was approximately 10 per cent lower than that obtained by the methods described above. This would indicate that for at least a part of the stroke, where the pressure between cylinder wall and piston was relatively high, a region of partial lubrication might exist.

Volumetric Efficiency

For the ideal engine, one having a mechanical efficiency of 100 per cent, the torque is a function of the charge volume. For economical utilization of fuels and maximum power, the charge volume, or volumetric efficiency, should be as large as possible. It, therefore, becomes important to analyze the variables which may have a bearing

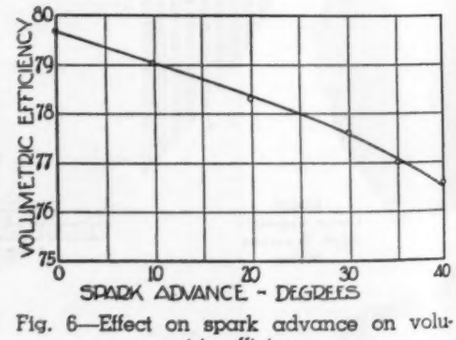
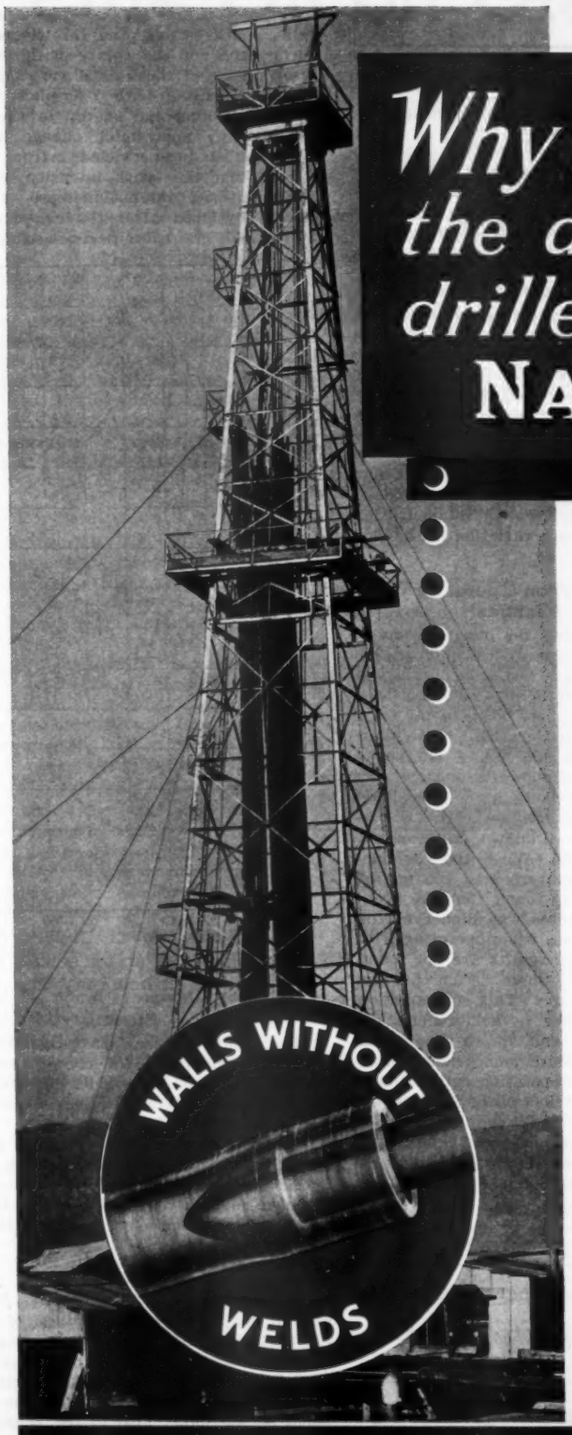


Fig. 6—Effect on spark advance on volumetric efficiency

on this characteristic. The volumetric efficiency here considered may be defined as the ratio of the quantity of combustible mixture drawn into the cylinder per stroke to the quantity which would fill the swept volume, both at the same conditions of temperature and pressure. It is important in this connection to give due consideration to the volume of fuel added to the air which.

The relation between volumetric efficiency and



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engine speed (Figure 3) is well known, and may if neglected, may result in errors as high as 6 per cent.

be definitely correlated with the valve timing and the characteristics of the induction system. The data for Figure 3 were obtained with constant compression ratio, mixture ratio, spark setting, cooling water, oil, and intake temperatures. Hence, the only dependent variables are the volumetric efficiency and the torque as a function of engine speed.

The effect of compression ratio on volumetric efficiency (Figure 4) was obtained by holding all independent variables constant except the compression ratio. Another method of obtaining these results is by cross-plotting the data obtained in the tests described above. This phenomenon may be explained to some extent by the fact that, when the clearance volume is large, the heat transferred

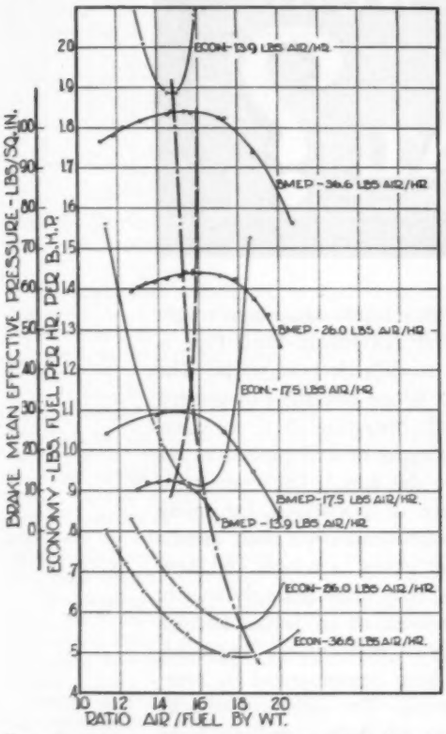

Fig. 9—Effect of mixture ratio and throttle position on economy and power

to the walls of the combustion chamber will decrease the volume appreciably more than when the clearance volume is small—partly because the temperature of the residual gas is lower in the latter case. This explanation, however, does not clarify the whole phenomenon, as indicated by calculation of existing conditions.[4] Hence, to justify the further decrease of volumetric efficiency with increase in compression ratio, Equation (2) is applicable—which shows that the gas-film transfer factor is increased with the increased existing pressures (Figure 5) and temperatures. This allows an increase in heat flow to the cylinder wall, with a consequent increase in oil and wall temperatures. The periodic heat interchange between cylinder wall and cylinder contents heats the fresh charge on the intake and compression strokes, and thus reduces the volumetric efficiency.

A similar explanation holds for the effect of spark advance before top dead center (Figure 6). These data were obtained by cross-plotting the results of tests where all dependent variables except spark setting were held constant. From first considerations it might appear that the volumetric efficiency should decrease with retarded spark due to the high exhaust temperatures. However, the mean temperature throughout the stroke is increased with advanced spark setting; likewise, the mean gas pressure throughout the stroke is increased with advance in the point of ignition. Referring again to Equation (2), it is noted that the gas-film transfer factor is increased—and, with it, as before, the rate of heat flow to the incoming fresh charge from the cylinder wall, oil and gas films.

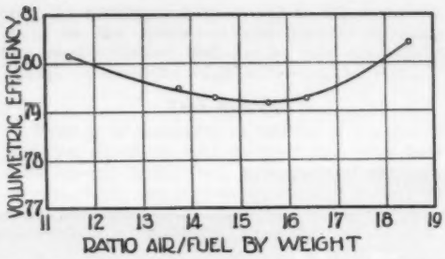

Fig. 7—Effect of mixture ratio on volumetric efficiency

With liquid fuels the volumetric efficiency is affected by mixture ratio because of evaporation. With gaseous fuels (Figure 7) this is hardly the case—and again the results obtained may be ascribed to the phenomenon indicated by Equation (2). The decrease in volumetric efficiency as the mixture ratio is increased to the point of a theoretically-correct ratio for complete combustion is most probably due to a rise in the temperature of the cylinder walls, head, and piston—with an accompanying rise in mean pressure throughout the cycle. An increase in mixture ratio beyond the theoretical value for complete combustion will increase the average volumetric heat of the cylinder contents, and so reduce the flame temperature and that of the cylinder walls and the piston as well as the mean pressures. Hence, in this case again the variation in volumetric efficiency may be ascribed to a variation in the gas-film transfer factor.

Engine Performance When Operating With Butane-Air Mixtures

The use of gaseous fuels for internal-combustion engines, in stationary and transportation equipment, is becoming more extensive.[1] The advantages of such fuels over liquid fuels have been demonstrated in many instances.[2] One of the more important fuels under consideration at the present time is butane. With the use of butane as a fuel it is possible to increase the compression ratio of the engine appreciably over that allowable when operating with gasoline.[3] The results of such a change are too well known, and need not be dwelt on at any length. When the variable-compression engine was converted to the use of butane-air mixtures, it was found that the economy for gasoline-air mixtures was higher at the same compression ratio than when operating with butane-air mixtures. These results are not found in equipment on the road, where better economy is always claimed for butane. This contradiction is evident if the difference in homogeneity between a gaseous mixture and an air-vapor mixture is considered. The more homogeneous mixture which obtains when operating with butane permits more uniform distribution of mixtures in the different cylinders of multi-cylinder engines, thus dividing the load developed more equally. It is obvious that, with such results, gaseous fuels can show an advantage over liquid fuels.

The output of the engine was found to be higher for the same conditions of operation when

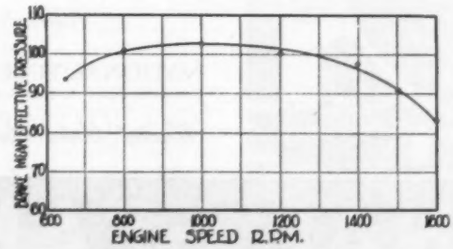

Fig. 8—Effect of engine speed on output

operating with butane-air mixtures than when operating with gasoline-air mixtures.[5] These results were, in general, due to the type of carburetors required for the different fuels—the venturi required for gasoline being smaller at the throat than the venturi required for gaseous fuels. This increased restriction resulted in an appreciable decrease in brake mean effective pressure (B.M.E.P.). Later tests, in which one common induction system was employed, did not show an appreciable variation for similar conditions of operation.

The volumetric efficiency is also influenced by speed, due to valve timing. The effect of volumetric efficiency on B.M.E.P. is evident from a comparison of Figure 8 with Figure 3. The data for Figure 8 were obtained at constant compression ratio, with spark setting and mixture ratio for maximum B.M.E.P.

Figures 9 and 10 show the effect of mixture ratio, spark setting, and throttle position on the performance of the engine with butane-air mixtures. Some of these data were taken with various conditions of battery-terminal voltage to determine whether the energy in the spark would indicate any appreciable change in engine performance. It was concluded from these investigations that the spark intensity within the test limits imposed did not increase or decrease the power developed after the engine was warmed.

(Detailed description figures 9 and 10 deleted.)

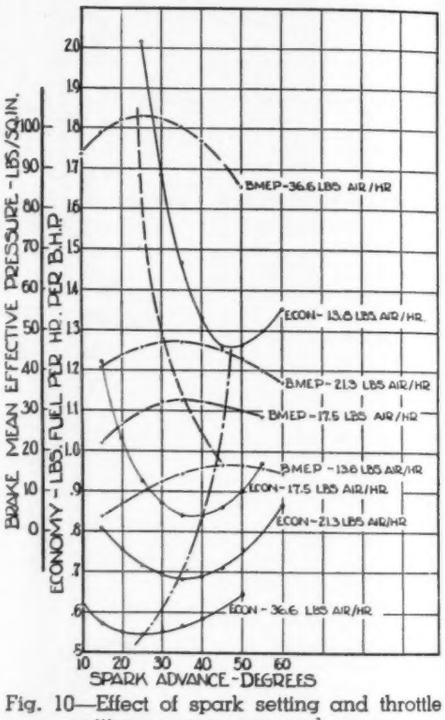

Fig. 10—Effect of spark setting and throttle position on economy and power

Summary

The results of these investigations have indicated the importance of close observations and control of the many variables encountered in tests on internal-combustion engines if these variables are to be separated.

In comparison with the previous data[6] butane-air mixtures for internal-combustion engines are in most respects more easily controlled in multi-cylinder engines than are gasoline-air mixtures, and under optimum operating conditions show better performance.

Acknowledgment

The author is indebted to W. F. Pemberton and H. W. Sylvis, of the College of Engineering, for the construction of the operating panels and the maintenance of the equipment, and to recent graduates of the College of Engineering who aided in the construction as well as in the collection of much of the data; also to the Standard Oil Co. of California and to the Shell Oil Co. for the fuels which they have supplied for these tests, and to G. L. Holzapfel for his suggestions and the special equipment which he has contributed.

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Thermal Polymerization Process Used by Pure Oil on Olefin-Bearing Gases

By M. B. COOKE, H. R. SWANSON and C. R. WAGNER*
Alco Products, Inc. Pure Oil Co.

The demand for antiknock fuel has been so great during the past few years that oil technologists have been searching intensively all possible methods and sources of supply. This study has been accelerated more recently by the demand for fuel for high-compression supercharged aviation motors with octane ratings far above anything which has been considered heretofore. Various schemes for cracking heavy oils have been proposed, and thousands of chemicals have been tried with the idea of their use as "dopes" to increase the antidetonating characteristics of gasoline. Little attention has been directed toward the gases produced as a by-product from cracking operations, a prolific source of valuable antiknock fuel.

Defines Polymerization

Polymerization, and its application to hydrocarbon chemistry known for many years, may be defined as the union of two or more molecules of a substance to form a larger molecule, the latter being called a "polymer." Polymerization is sometimes incorrectly referred to as condensation. The olefins of low-molecular weight, viz., ethylene, propylene, butylene, etc., form polymerization products when subjected to heat and pressure without catalysts.

The significance of the polymerization of gaseous olefins is the production of gasoline-like hydrocarbons which, due to modern internal-combustion-engine designs and demands for fuel, serve as desirable fuels, or blending fuels, due to their inherent antidetonating characteristics when used in such engines.

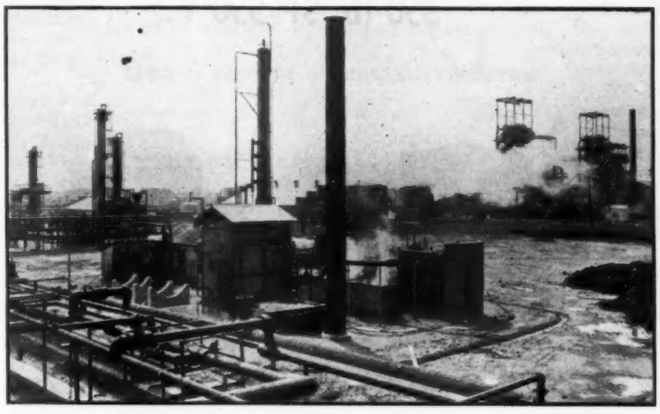
A search of the literature on polymerization reveals that there have been two plausible theories or explanations of the mechanism of polymerization of unsaturated hydrocarbons. The first theory was proposed when technologists were studying the mechanism of sulfuric-acid refining of hydrocarbon oils containing unsaturates, viz., that sulfuric acid forms first an acid ester or alkyl sulfuric acid by addition; this addition product subsequently reacts with another molecule of the olefin to form the polymer. The sulfuric acid is liberated, and theoretically may go through many cycles. If iso-butylene is polymerized as the olefin, di-iso-butylene (iso-octylene) would be obtained, which has twice the molecular weight of the raw material, butylene. The second theory is called the partial-valence theory. According to this theory the doubly-linked carbon atoms have partial valences or "residues of free affinity." The further assumption is made that the molecules contain a mobile or labile hydrogen atom (the assumption of a labile hydrogen atom has been made to explain many reactions) which shifts from one molecule to the other, thus permitting polymerization. This explanation may account for polymerization in the presence or absence of catalysts where no addition compounds are formed.

According to either of the above theories, two unlike molecules may also react—thus explaining the formation of all the higher polymers.

The above characterizes in general, from a broad chemical viewpoint, the process of polymerizing light hydrocarbons. The opinions with respect to the reaction mechanism of the conversion of specific constituents are divergent, and it is not considered within the scope of this article to discuss this in detail.

From an equipment-design standpoint, theoretical consideration of the kinetics of the reaction are of importance. Polymerization is generally assumed to be a bi-molecular or second-order reaction. The reaction-velocity constant, k, is expressed by the equation:

$$k = \frac{x}{at(a-x)}$$



General view of the Pure Oil Company's polymerization unit at the Toledo, Ohio, refinery

Where:

t = the reaction time
a = the reactant at the beginning of the reaction (t=0), and
x = the part of the original reactant which is converted in the time t.

A consistent correlation of data will establish the values of the reaction-velocity constant as a function of the reaction temperature for any constituent. Correct and consistent reaction-velocity data are the prime requisite for the design of equipment of this type.

In the earlier literature on pyrolysis of hydrocarbons, the opinion is expressed that aromatics are only formed at extremely high temperatures—temperatures considerably above those to be disclosed as proper and sufficient in this article. Free-energy relationships, however, indicate that aromatics are formed from certain olefins of low molecular weight at as low a temperature as 800° F. The older literature referred to above mentions temperatures in the order of 1,500-2,000° F. When polymerizing at comparatively low temperatures and high pressure, the simple junction of molecules with the least disturbance of the existing carbon-to-carbon and carbon-to-hydrogen linkages seems to prevail, while at higher temperatures a complete rearrangement seems to take place leading to the formation of cyclic compounds. The high-temperature polymerization condensate is almost completely aromatic.

Heretofore attempts to form aromatics from low-molecular-weight hydrocarbons have been largely confined to pyrolysis of paraffin gases, an endothermist process. We are discussing here a process for polymerizing olefins, an exothermic reaction. It is, therefore, possible that local points of very high temperature exist at the time of formation of aromatic molecules, but on the surrounding gases conduct the heat away rapidly enough to maintain a lower average temperature.

A. P. I.—Polymerization of normally gaseous hydrocarbons after an extensive research period is now being employed commercially to produce motor fuel of higher octane rating. Here the author gives a description of different systems of the thermal process now being used successfully in many plants to effect a union of the unsaturated hydrocarbons to form a liquid boiling within motor-fuel range.

Low Sulfur Distillates

The polymerization of olefinic gases for the production of low-sulfur aromatic compounds is destined to increase in importance. High antiknock-value gasoline, or gasoline-blending material—as well as benzol, toluol, and xylol—can be made with good yields, and at a profit, at the present time. The trend of refinery cracking has been, and still is, from low temperatures (liquid phase cracking) to higher temperatures with a corresponding decrease in pressures. This tendency has resulted in an ever-increasing gas yield of higher unsaturation. This is ideal for polymerization, as an otherwise wasted (or nearly so) by-product—gas—becomes a valuable charging stock. The refiner can now install a polymerization plant, and the cost of it can be paid for, in one year or less, out of its earnings. The average refiner can increase his cracked-gasoline output by polymerization by 15 to 20 per cent if he polymerizes all his cracking-still gases. This material has a very high blending value, and can be made either high in volatility or low in volatility. This flexibility gives the choice of employing high percentages of butane in the blended gasoline; or, if the material available for blending has low volatility, the necessary volatility may be obtained to a large degree from high-volatility polymer gasoline.

The equipment for carrying out the process is similar in appearance, operation, and instrumentation to cracking-still equipment—and for this reason few additional men are needed if the polymerization plant is installed close by, or in conjunction with, the cracking stills. Treating of the distillate is no different from other gasoline distillates, and no special processes are necessary.

On the contrary, most polymer distillate is lower in sulfur content than cracked or straight-run gasoline.

The most logical program to follow in this country in adopting polymerization consists of installing plants first to polymerize vapor-phase cracking-still gases. These are rich in unsaturates,

*Paper presented before Los Angeles meeting of American Petroleum Institute. Authors' title: "The Thermal Process for Polymerizing Olefin-Bearing Gases."

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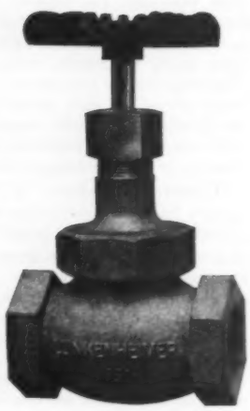


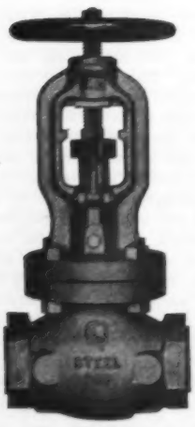
Fig. 1878 Globe
Renewable "NT4" Nickel Alloy Seat and Disc
Union Bonnet

Fig. 1879 Lift Check
Renewable Bronze Disc
Integral Seat

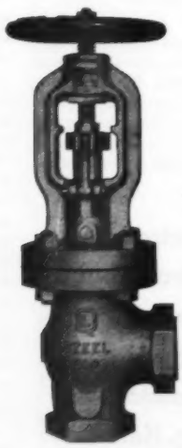
Fig. 1880 Swing Check
Renewable Bronze Disc
and side Plugs

Fig. 1881 Gate
Renewable "NT4" Nickel Alloy
Seats and Disc

STEEL VALVES (Screw and Flange Ends)
350 lb. SP-580° F. (Basic Rating 300 lb. SP-750° F.)

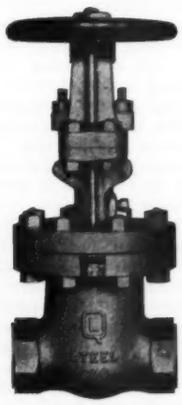


Globe
Fig. 1872 Screw Ends
Fig. 1600 Flange Ends
Renewable Stainless Steel Stem and Disc
Nickel Alloy Seat Ring



Angle
Fig. 1873 Screw Ends
Fig. 1601 Flange Ends
Renewable Stainless Steel Stem and Disc
Nickel Alloy Seat Ring

Swing Check
Fig 1490 Screw Ends
Fig. 1491 Flange Ends
Renewable Stainless Steel Disc
Nickel Alloy Seat Ring



Gate
Fig. 1869 Screw Ends
Fig. 1498 Flange Ends
Renewable Stainless Steel Stem and Disc
Nickel Alloy Seat Rings

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and are amenable to polymerization at a very reasonable cost. By including a pyrolysis step, a very high ultimate yield of polymer gasoline is obtainable from this source of raw material. The liquid-phase cracking-still gases are, in general, rich enough in unsaturates to merit one step of polymerization before a pyrolysis step.

A second source of polymerization raw material is the huge quantity of natural-gasoline tops and natural gas which is available. Natural-gasoline tops will yield high percentages of polymer gasoline when dehydrogenated and polymerized. Natural gas can be used as a raw-charge material for polymerization, but the yield of gasoline is less.

When it is considered that our gasoline production can be increased from 10 to 25 per cent (of our total consumption) from the same amount of crude oil per day, it is highly important that this conservation step be pushed and encouraged most vigorously.

Charging Stocks Available

Commercially-feasible charging stocks for gas polymerization for the production of motor fuel contain hydrocarbons varying from the lowest member of the paraffin series, methane (CH_4), to the normally gaseous butylenes of four carbon atoms. The methane group is found in refinery gases, and constitutes the major portion of natural gas. The modern polymerization plant can utilize any of this raw material in such a way that the gasoline produced will be a very substantial part of the total gasoline production.

The gases available as charging stock may be divided into three main classes, for convenience in arriving at yield figures. The most easily polymerizable gases are formed in the vapor-phase cracking of hydrocarbon oils. In this country there are approximately 90 plants, each of which yields an average of 1,200,000 cubic feet of highly-unsaturated gases per day. Since the unsaturated content is high, no pyrolysis of the gases before the polymerization operation is necessary. Table 1 shows analysis of typical residue gases from a vapor-phase cracking system.

TABLE 1—ANALYSIS OF GYRO VAPOR-PHASE GAS

Constituent—	Sample No. 1 (Mol %)	Sample No. 2 (Mol %)
$CH_4(+H_2)$	32.5	37.9
C_2H_4	23.9	25.6
C_2H_6	13.4	13.8
C_3H_6	16.8	16.8
C_3H_8	4.9	3.1
C_4H_8	6.1	2.8
C_4H_{10} and heavier	2.4	
Specific gravity (air = 1)	1.035	0.95

Typical comparisons of the overhead from a stabilizer, working in conjunction with a Gyro vapor-phase cracking and compression-gasoline recovery system, are given in Table 2.

The amount of stabilizer gas in per cent of the total residue gas will vary considerably, depending upon the method of gasoline recovery employed in connection with the vapor-phase cracking system.

The above gases may be handled in two ways:

(a) Compressed and charged as compressed gases to the polymerization coil (see Figure 2); or

(b) A major portion of the residue gas may be recovered as stabilizer overhead in liquid state and pumped to the polymerization unit (see Figure 3).

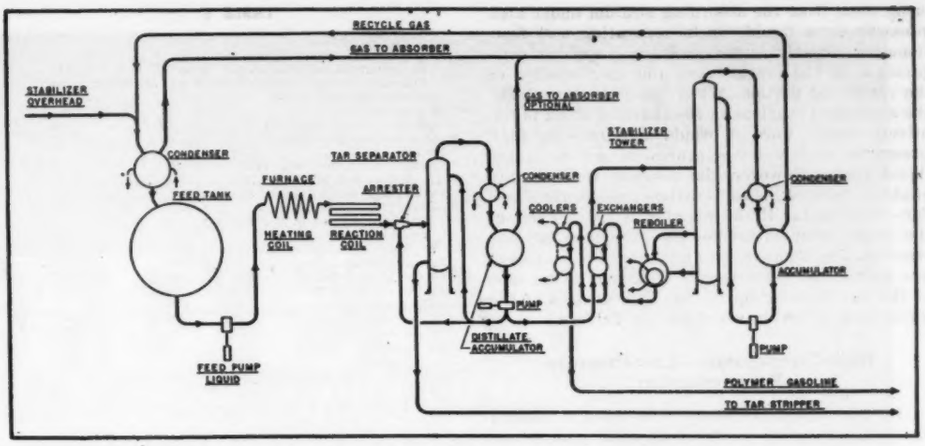

Fig. 2—Gas-charge, high-pressure—low-temperature

When charging a gas of the composition shown in Table 1 (vapor-phase cracking gas) the entire gas is compressed to 600-800 pound pressure and heated to 900-1,000° F. in a pipe-coil heater.

TABLE 2—ANALYSIS OF STABILIZER OVERHEAD

Constituent—	Sample No. 1 (Mol %)	Sample No. 2 (Mol %)
CH_4+H_2	0.5	1.2
C_2H_4	9.2	7.1
C_2H_6	8.3	7.8
C_3H_6	40.3	37.6
C_3H_8	10.4	11.6
C_4H_8	28.4	30.5
C_4H_{10}	2.6	3.4
C_5 and heavier	0.3	0.8
Unsaturates	77.9	75.2

TABLE 3—OPERATING DATA

Charging stock:	
Residue gas from Gyro vapor-phase cracking system:	
Specific gravity (air=1)	1.06
Unsaturates, per cent	47.2
Yields of products:	
Treated gas:	
Cubic feet per cubic foot of charge	0.80
Specific gravity (air=1)	0.87
Unsaturates, per cent	18.4
Liquid:	
Gallons per 1,000 cubic feet of charge	4.4
E. P. gasoline:	
Gallons per 1,000 cubic feet of charge	3.7
Gravity, degree A.P.I.	52.4
Per cent of total liquid	84
ASTM distillation of E. P. Polymer gasoline in Degree F.:	
Initial boiling point	96
10 per cent point	134
50 per cent point	220
80 per cent point	302
Endpoint	420

The gas is soaked in a reaction chamber which may take the form of a coil, which is cooled in order to absorb the exothermic heat of reaction, and then chilled by injection of either cold gas or oil. The reaction is checked at about 60-70 per cent conversion, necessitating a re-circulation ratio of about 1.5.

The mixture is fractionated, and the liquid product stabilized—giving a yield of gasoline of about 3.25 gallons to 4.5 gallons per 1,000 cubic feet when operating under these conditions. The data obtained from a typical run are given in Table 3.

These data reveal that about 28 per cent of the residue gas from the vapor-phase cracking unit is converted to polymer gasoline when operating under the conditions outlined.

We estimate that there are 90 vapor-phase cracking units in the United States with an average capacity of 1,000 bbls. per day of reduced crude. The gas produced from these units amounts to approximately 100,000,000 cubic feet per day. If this quantity of gas were polymerized, with yields of E. P. gasoline conservatively estimated at 3.25 gallons per 1,000 cubic feet of gas charged, there would be produced 325,000 gallons or 7,800 bbls. per day. This polymer gasoline contains about 25 per cent of aromatics, is highly volatile, and has an octane value, by the ASTM method, of 78-80, and a blending value of 96.

This process does not produce the maximum of aromatics. In order to produce the maximum aromatic content, it is necessary to operate under other temperature-pressure conditions as described later.

TABLE 4—LIQUID-FEED POLYMERIZATION OPERATION

Commercial plant handling 4,050,000 cubic feet (standard) per day. Average operation, September 1 to September 20, 1934.

Charging stock (including re-cycle):	
Specific gravity (air=1)	1.51
Unsaturates, mol per cent	49.4
Conversion of unsaturates, per cent	86.7
Re-cycle ratio	1.75
Yield and properties of products:	
E.P. gasoline:	
Gasoline per 1,000 cubic feet of fresh charge	8.8
Gravity, degree A.P.I.	55.0
Octane No., A.S.T.M.	76.0
A.S.T.M. distillation in degrees F.:	
Initial boiling point	90
10 per cent point	105
30 per cent point	145
50 per cent point	182
90 per cent point	323
Endpoint	398
Fuel oil:	
Galonsl per 1,000 cubic feet of fresh charge	3.0
Gravity, degrees A.P.I.	8.0
Treated gas:	
Specific gravity (air=1)	1.01
Unsaturates, mol per cent	22.0

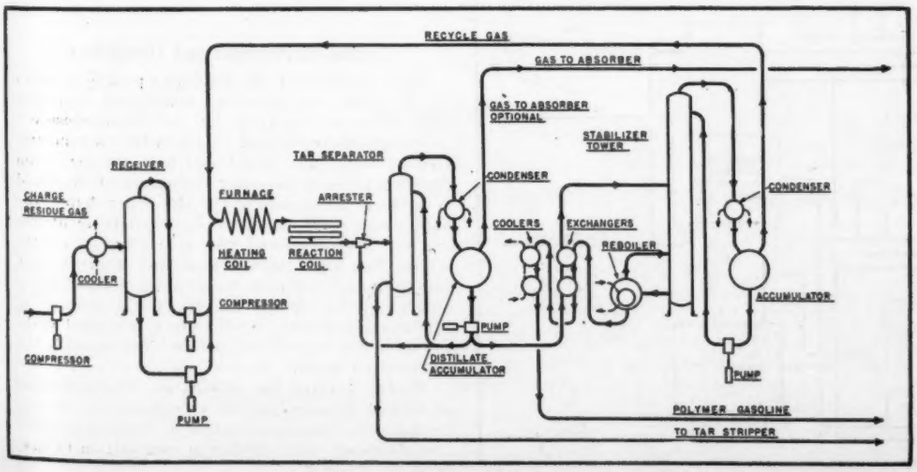

Fig. 3—Liquid-charge, high-pressure—low-temperature

The alternative operation mentioned above consists of utilizing to the utmost the advantages of liquid charging stock for the polymerization operation. In this operation the gases from the vapor-phase cracking operation are processed to eliminate the lower-molecular-weight saturates (C_1 and C_2) so far as is practical, and to concentrate the active olefins. Many advantages result from this procedure: 1, lower power costs due to the great reduction in horsepower for compression of gases in charging the polymerization unit; and, 2, the reduction in the plant investment due to reduction in size of the several pieces of equipment as a result of eliminating the inactive gas from the cycle. A third, and very worthwhile, advantage is realized at the same time in that the uniform control of the polymerization reactions becomes very simple.

The process of preparing the charging stock consists either in absorbing the higher-molecular-weight constituents of the cracked gas and recov-

ering them from the absorbing medium under high pressure as a liquid, or in separating and fractionating directly under pressure—requiring compression of the cracked gas and fractionation of the condensed portion. When using these methods, the amount of ethylene in the charging stock is relatively small, since it would require very high pressures or low temperatures to get it in the liquid phase. However, the gasoline yield is only slightly reduced, since ethylene polymerizes too far—forming tar if the reaction is carried out at the proper temperature for the propylene-butylene reaction. The temperatures and pressures employed are within the same ranges as given in the case of the gas-charging operation. Typical data of the liquid-feed operation are found in Table 4.

High-Temperature—Low-Pressure Polymerization

By the high-temperature—low-pressure method of operation, good yields of gasoline can be obtained. The gas is compressed to feed pressure and heated. Temperatures existing in the reaction coil range from 1,150 to 1,300° F., and pressures are in the order of 50 to 75 pounds per square inch, gage.

Operating on absorber gas, the unsaturates in the gas are predominantly ethylene, and give yields to distillate from 3 to 4.5 gallons per 1,000 cubic feet employing re-circulation as indicated by the test data in Table 5.

TABLE 5

Operating conditions:	
Once-through operation:	
Temperature of coil outlet, degrees F.	1,275
Pressure of coil outlet, lb. per sq. in. gage	60
Conversion, per cent	37.4
Charging stock:	
Specific gravity (air=1)	0.79
Unsaturates, per cent	39.4
Distillate made:	
Gallons per 1,000 cubic feet	1.75
Gravity, degrees A.P.I.	21 6
Percentage boiling up to 350 degrees F.	76
Octane No., A.S.T.M.	102
Treated gas:	
Cubic feet per cubic foot of gas charged	0.85
Specific gravity (air=1)	0.72
Unsaturates, per cent	29

The yield of distillate at the rate of conversion obtained in cyclic operation would be approximately 4.0 gallons per 1,000 cubic feet.

Operating on stabilizer overhead, the unsaturates in the charge are mostly propylene and butylene, and yields of distillate from 8 to 12 gallons per 1,000 cubic feet are obtained as indicated by the test data in Table 6.

The yield of distillate for cyclic operation would be approximately 11.0 gallons per 1,000 cubic feet. The percentage boiling up to 350° F. can be increased by operating at a lower rate of conversion per pass.

The yield of distillate seems to be somewhat higher for the low-temperature—high-pressure operation than for the high-temperature—low-pressure operation when operating on the same charging stock, but the yield depreciation is more than compensated for by the appreciation in quality.

TABLE 6

	Distillate	350 E.P. gasoline
Operating conditions:		
Once-through operation:		
Temperature of coil outlet, degrees F.	1,175	
Pressure of coil outlet, lb. per sq. in., gage.	55	
Conversion, per cent	80	
Charging stock:		
Specific gravity (air=1)	1.352	
Unsaturates, per cent	79.6	
Distillate made:		
Gallons per 1,000 cubic feet	9.8	
Gravity, degrees A.P.I.	26.4	
Percentage boiling up to 350 degrees F.	68	
Octane No., A.S.T.M.	86	
A.S.T.M. distillation in degrees F.:		
Initial boiling point	118	120
10 per cent point	154	172
30 per cent point	218	190
50 per cent point	256	204
70 per cent point	368	224
90 per cent point	...	267
End point	...	352
Treated gas:		
Cubic feet per cubic foot of gas charged	0.46	
Specific gravity (air=1)	0.86	
Unsaturates, per cent	34.5	

In the high-temperature operation a gasoline of 85-105 octane No. (A.S.T.M.) is obtained. The octane-blending value is approximately 105-125. The polymer produced is almost entirely aromatic: and the volatility, of course, is low. The low volatility is a very desirable feature in many instances, in as much as the octane number of the blended gasoline may be very much increased without removing any butane before blending with polymer gasoline.

To obtain the maximum polymer gasoline possible from a given quantity of by-product gases, a combination of pyrolysis and polymerization steps seems to be ideal. This system gives the maximum yield of high-quality polymer gasoline from charging stocks which originate from gasoline-cracking stills of the liquid-vapor-phase types. In the case of liquid-vapor-phase gas, it is estimated that there are produced 1,000,000,000 cubic feet per day. If this high-temperature—low-pressure combination system were used, there could be produced over 1,200,000,000 gallons per year of 100-octane gasoline. This distillate is 80 to 85 per cent aromatic. Therefore, there could be produced over 1,000,000,000 gallons of relatively pure aromatics per year, or 24,000,000 bbls. per year.

A simple illustration of a high-temperature process, comprising a pyrolysis and a polymerization step, is given in Table 7 (natural gas as the original charging stock is used).

The treated gas is lower in gravity and has a lower heating value, which makes it more desirable for use as a domestic or other heating gas.

Natural gas produced in this country in 1933 amounted to 1,555,474,000,000 feet. The figures for 1934 are not yet available, but are probably higher. In 1932 there were produced 2,555,000,000,000 feet. Taking the 1933—and more conservative—figures as a basis for figuring the potential polymer gasoline, and assuming the average composition to be the same as given in Table 8, we could obtain 2.1 gallons of 350-E.P. distillate per 1,000 cubic feet, or 2.1 × 1,555,474,000 = 3,270,000,000 gallons per year (77,800,000 bbls. per year). There would still remain 1,414,000,000,000 feet for domestic or industrial use at a heating medium.

The potential yield of polymer gasoline from refinery and natural gas in this country, utilizing the thermal process with efficiencies obtainable at this time, amounts to approximately 110,000,000 bbls. per year, or roughly 25 per cent of the total gasoline consumed in the United States during the year 1934. The octane value is higher than that obtained by any other known thermal or catalytic process for producing gasoline. Only tetraethyl lead may be considered a competitor for enhancing the anti-knock value of gasoline—and this material does not increase the amount of gasoline to be used as fuel, but only alters and improves the anti-knock quality.

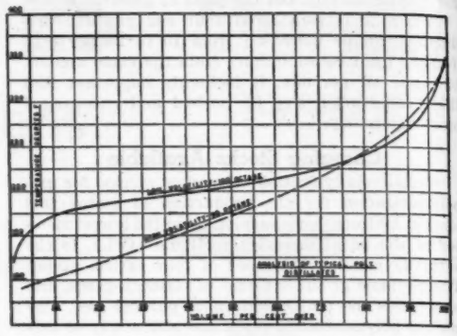

Fig. 4—Analysis of typical poly distillates

TABLE 7

Charge:	
Specific gravity (air=1)	0.815
Composition:	(Mol %)
CH_4	70.5
C_2H_6	12.7
C_3H_8	10.3
C_4H_{10} and heavier	6.5
Pyrolysis gas:	
Specific gravity (air=1)	0.646
Composition:	(Mol %)
H_2	11.5
CH_4	62.5
C_2H_4	15.7
C_2H_6	5.1
C_3H_6	2.5
C_3H_8	1.2
C_4 and heavier	1.5
	Gallons per 1,000 cu. ft. of charge
Liquid made:	
Pyrolysis step	0.42
Polymerization	2.38
Total	2.80
Percentage boiling up to 350 deg. F.	75
Octane No., A.S.T.M.	104
Treated gas:	
Cubic feet per cubic foot of gas charged.	0.91
Specific gravity (air=1)	0.59

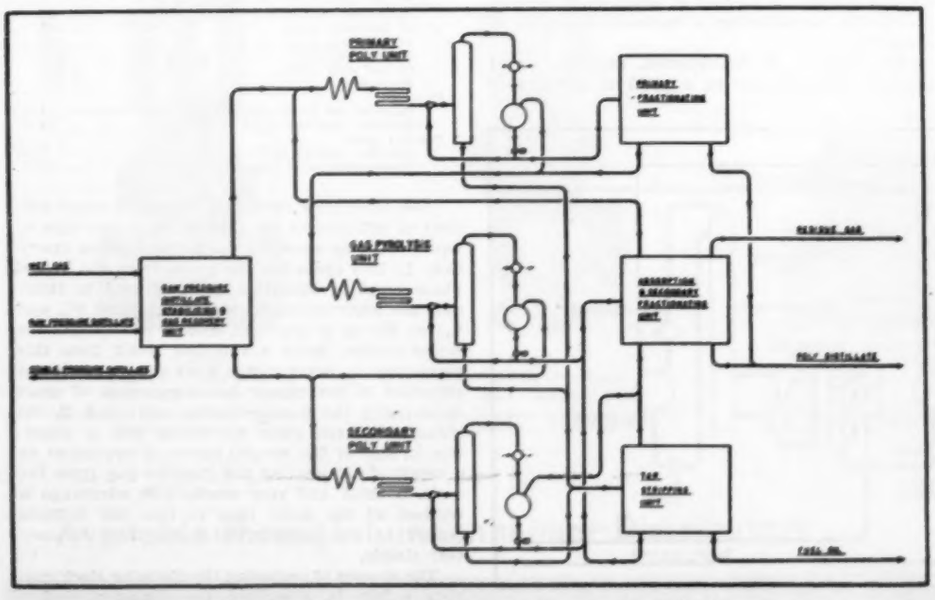

Fig. 5—Three-unit, polymerization and pyrolysis

Types of Polymerized Distillates

The character of the distillates produced varies widely with the operating conditions employed. The distillate obtained by the high-pressure—low-temperature method of operation is comparatively volatile, and would only have the maximum blending value if the other component of the blend is lacking in volatility. On the other hand, the high-temperature polymerized distillate is almost entirely aromatic—and the volatility, of course, is low. The low volatility is a very desirable feature in many instances, in as much as the octane number of the blended gasoline for a given Reid vapor pressure may be very much increased without removing any butane before blending with the polymerized stock.

Figure 4 gives the distillation characteristics of typical polymer gasolines produced by various methods. The charging stock in all cases is a stabilizer overhead stock, similar in composition to that given in Table 2.

The data in Figure 4 bear out important fac-

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tors to be considered when selecting a polymerization plant.

Multi-Coil Conversion System

A residue gas from a pressure liquid-vapor-phase cracking system, which is comparatively low in unsaturates, should be processed in a system involving three unit operations if the maximum yield of high-octane distillate is desired:

1. High-temperature—low-pressure polymerization of propylene and butylene.

2. Pyrolysis of gas remaining after the polymerization step.

3. High-temperature—low-pressure polymerization of the cracked gases.

Let us select a typical charging stock of this type as found in most refineries in the form of stabilizer overhead gases, which contain—we shall assume—only about 30 per cent of unsaturates. By polymerizing as a first step, we have the advantage that we can operate under the most favorable temperature and pressure conditions for the conversion of the propylene and butylene to polymer gasoline. The stabilizer overhead gases are already under pressure and, by proper cooling, are liquefied as a by-product of the stabilizing operation—thus eliminating the installation of large compressors to feed the polymerization unit. Figure 5 shows the various phases of operation, and indicates the essential equipment.

In the primary polymerization step the charge is heated to the proper temperature, and enters the reaction coil which is designed to give the desired time-temperature effect. Cooling means is provided to keep the temperature within the proper limits. The reaction products, immediately upon leaving the coil, are chilled to stop any further reaction, and simultaneously are cooled to a temperature low enough so that heavier products will be dropped out in the tar separator. Gases, distillate vapors, and chilling medium forming the overhead from this separator are refluxed for endpoint control. The total overhead passes to a cooler and accumulator where the chilling medium, polymerized distillate, and a portion of the gaseous constituents are condensed. The uncondensed gases and vapors from the accumulator are passed directly to the gas-pyrolysis unit.

A portion of the condensate from the accumulator is used as the chilling medium previously referred to; and the remainder, equivalent to the condensed products of reaction, is pumped to the fractionating unit. In this unit the polymer distillate is stabilized to desired specifications, and all gaseous compounds—including excess C_4 constituents not desired in the finished distillate—are taken overhead and form additional feed to the gas-pyrolysis coil.

In the gas-pyrolysis coil the charge as recovered in the primary polymerization step is heated to a temperature in excess of 1,300° F. A reaction time as short as possible is desired to prevent the unsaturates once formed from entering secondary reactions leading to the formation of tar. The products of reaction are chilled to a temperature low enough to liquefy compounds in the fuel-oil and tar range. Gases and distillate vapors, and vaporized chilling oil pass overhead from the tar separator to a condenser and accumulator, where the chilling material is condensed. The gas remaining after compression and cooling is charged to the secondary polymerization coil, and submitted to a high-temperature—low-pressure reaction. The chilling of the conversion product, tar separation, condensing of chilling medium, is analogous to the method use in the primary polymerization step. Since the reaction products contain a high percentage of hydrogen and methane, recovery of polymer distillate cannot be effected by condensation under the low operating pressure. Recovery may be accomplished by compression and subsequent condensation. However, in most cases it is believed that absorption will be more economical. All polymer distillate distilled from the absorption oil is accumulated and fed, together with the pyrolysis distillate, to the secondary fractionator. The bottom product from this unit is stabilized to desired specifications, and the light overhead material is passed directly under its own pressure to the primary polymerization unit as recycle.

The bottoms from the various tar separators are combined, heated, and then stripped of all fractions of gasoline of boiling range.

A unit of the type described above is very flexible, and insures the highest yield of distillate for charging stocks varying widely in composition.

Cost of Plants

It has already been mentioned that polymerization plants are similar in appearance and operation to cracking plants, especially so if the cracking plant is modern and is equipped with gasoline-recovery and stabilization units. The cost of construction and operation is likewise very nearly the same as it is for the modern cracking installation. The only other worthwhile item affecting the cost of producing polymer gasoline or aromatics is the value of the charging stock to the polymerization unit. In this case it is a residue gas and, in general, its cost is measured by its heating value, since it is used instead of other heat-producing products such as fuel oil. It is safe to assume, in the majority of cases, that the charge gas carries a value equal to fuel oil in a given locality. It should also be considered that gas from refinery operations cannot be shipped to market, in most cases, without purification—and then only if pipe lines are available. It appears entirely fair, therefore, to give the gas-charging stock a maximum value not exceeding heavy fuel oil. With this as a basis, it is found that polymer gasoline can be produced in this country at a cost not exceeding 5 cents per gallon at the present time.

If we consider the production of highly-aromatic polymer distillate, it is quite evident that we have the cheapest source of aromatics so far made available. The general conclusion to be drawn, as regards the economics involved, is that polymerization is a very attractive commercial process for refiners to install. As the demand for antiknock fuel increases, the returns from polymerization likewise increase.

Acknowledgments

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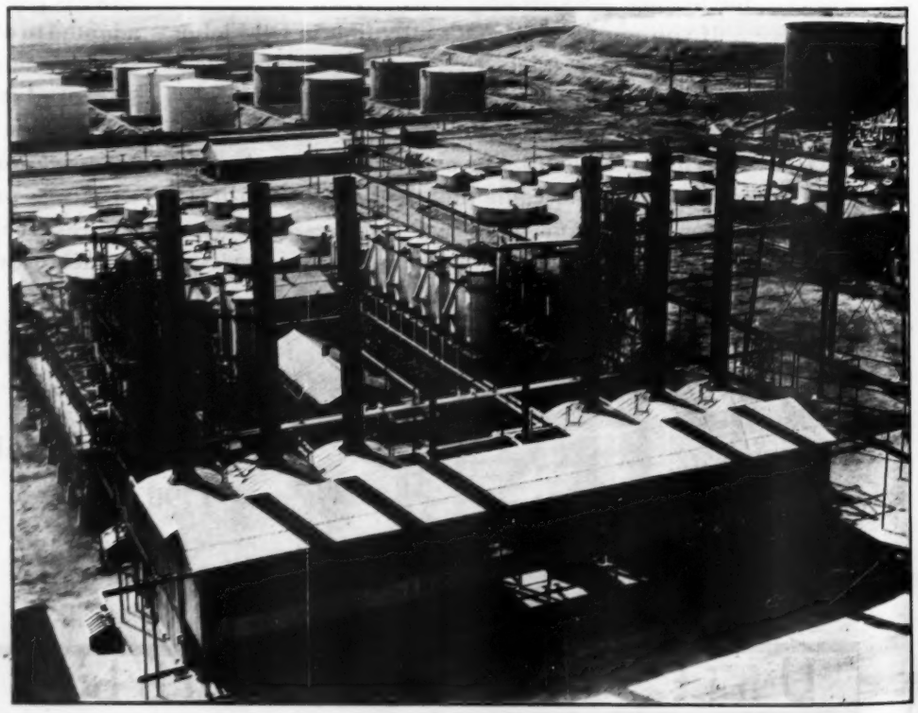

Distillation units at the Wilmington, Calif., refinery of the Shell Oil Company

Types of Chassis Lubricating Greases Influenced by Equipment Changes

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A.P.I.—Changes in chassis equipment are influencing the type and grade of chassis lubricating greases now manufactured. Progress made in manufacturing lubricating greases with respect to equipment and technical control are pointed out and different types of greases used in chassis lubrication are discussed in this article.

A survey made by the Department of Statistics of the Institute in 1934 showed that the consumption of lubricating greases for chassis lubrication of automotive equipment was estimated at 1.56 pound per 100 gallons of gasoline. On a basis of total gasoline consumption, that would mean approximately 285,000,000 pounds. Since considerable gasoline may have been used for other than automobiles, trucks, and buses, these figures may be a little high—but undoubtedly the total amount was well over 200,000,000 pounds.

If one listens to automobiles squeaking along on our streets and highways, it is readily apparent that, even though the above figures seem very large, there is still an enormous potential market if drivers could be converted to regular greasing periods. This, of course, applies particularly to passenger automobiles, as fleets of trucks and buses usually receive better attention.

When the gasoline supply of an automobile is exhausted, the engine stops and gasoline must be purchased if further progress is desired. However, that same car can squeak, squeak, squeak for mile after mile, practically crying for grease—and there is no response from the driver. How much pleasanter and safer it would be for such people if their automobiles could balk and refuse to move until thoroughly greased.

It seems that the gospel of specialized lubrication, requiring the application of proper and specific lubricating greases to the automobile chassis, has been so widespread that all greasing is now done that way. Actual field contacts, however, are a sad revelation that many are still stocking only two or three products and do not have the proper equipment for first-class work. Thus, the motorist who wants an efficient grease job should still first investigate as to equipment and lubricating greases available.

Progress is being made, however, in converting all concerned to the correct application of the various needed lubricants at the proper time intervals. The large and some small oil companies have been active. The manufacturers of lubricating greases have passed out a world of information to their trade. The Chek-Chart Corp. has been, and is, doing a fine work in that direction by providing durable, authentic charts giving complete lubrication details of all automobiles. The "Service Man's Guide to Automotive Lubrication," issued by them, is high in educational value. Their bulletins and consulting service are also most helpful to those who wish to keep right up to date.

Churchill[1] last year called attention to changes in design which would make chassis lubrication easier. However, manufacturers evidently feel that style must come first; so now we have skirts and changes in body design which really make correct greasing more difficult.

Blackwood and Spencer[2], in their excellent paper on chassis lubrication problems, clearly show the need for standardization of chassis parts requiring lubrication and changes which would mean better lubrication. If that could be done by the automobile manufacturers, it would surely lend much encouragement to the development of standard specifications for chassis lubricating greases, as urged by Mougey[3], and eventually result in simplification with fewer greases necessary.

It is logical to assume, however, that the automobile manufacturers are in the same position as the manufacturers of lubricating greases, in that differences have sales value of more or less importance. With the automobile, however, a careful analysis might show that other features could be stressed with as good or better results.

*Delivered at the Los Angeles meeting, American Petroleum Institute. Author's title: "Chassis Lubricating Greases."

Safety Should Be Stressed

A very laudable campaign is now being made to reduce automobile accidents. The loss of life and those maimed forever are bad enough, but there is also a terrific economic loss due to lost time and destroyed property.

While in general it is true the driver is responsible for the accident, the condition of the automobile also has a bearing. If it has not been greased for months, difficult handling or slow response may cause a wreck.

Frequently we read of accidents caused by broken steering gears. No doubt wheel bearings, universal-joint failures, or gear trouble may sometimes be responsible—even though something else is blamed.

Those charged with lubrication of automobiles have a grave responsibility. They should see that the correct lubricating greases are properly applied at the stated intervals. They should also urge, and keep on urging, all automobile drivers to have their cars greased regularly. It is an extra insurance against accident which has a small annual cost.

Chassis Equipment

Before discussing chassis lubricating greases, it might be well first to consider briefly the equipment on which they are used, as that has influenced the type and consistency of the greases. Since the largest quantity of lubricating grease is consumed on shackles and related bearings, shackles and bearings are placed first.

Shackles

The old so-called straight-hole shackle is slowly passing out of the picture due to the development of more efficient types. Among the first of these was the Tryon shackle, which embodies reservoirs of lubricant, and was an effort to get away from the "freezing" of shackle bolts which had been prevalent—especially where greasing was neglected. There is also an excellent arrangement for keeping the shackle tight. Unfortunately, the manufacturers of that shackle and the automobile manufacturers did not specify the best lubricant or give sufficient publicity to the effect that a special type was necessary. First a transmission oil was recommended; and when it was found to empty from the grease reservoirs too quickly, felts were placed at the ends of the reservoirs—but they were not entirely satisfactory. In the meantime lubricating-grease manufacturers had found that a semifluid pressure-gun grease was best, and were calling the attention of their trade to the necessity for its use. The application of pressure-gun greases not of semifluid consistency and transmission oil caused undue wear which required the replacement of thousands of Tryon shackles.

About the same time the roller-bearing type of shackle, requiring lubrication only at long intervals, was brought out. It seemed to be satisfactory; but apparently was found too expensive, as it was discontinued except on higher-priced models.

The threaded shackles next appeared, the first being a threaded bolt with the conventional hole for the grease going to the center so it could spread each way on the threads. Later came the so-called "U" type, with threads on both arms of the "U", and the grease applied at the ends of the sleeves. Threaded shackles of some sort are decidedly in favor at present.

It will also be recalled that rubber shackles were earlier used all around on some cars; but evidently did not give best results, as most recent models have a rubber shackle at one end of the spring and a threaded shackle at the other. Rubber or rubberized shackles are apt to develop squeaks which are hard to eliminate, because oil or grease causes deterioration of rubber. Glycerin mixtures have been used, but do not last long.

There have not been any particular changes in the rods, king pins, or drag links. Probably the bearings are somewhat more serviceable than formerly. Since these parts have an intimate connection with proper and safe steering, it is most important that they be efficiently lubricated at all times.

Individual front springing has introduced bearings which add a little to the quantity of pressure-gun grease needed for chassis lubrication of such cars. Those servicing such equipment have found that greasing more frequently is necessary if wear is to be prevented. Even where the most durable type of grease is used, such has proved to be the case.

Wheel Bearings

The increased use of roller bearings in recent years has made better wheel-bearing greases necessary, as it was found that roller bearings were somewhat harder to lubricate than ball bearings. Four-wheel brakes made it obligatory to use a lubricating grease which had good resistance to the softening effect of heat, so the grease would not leak or flow onto the brake bands. The bearing manufacturers are giving much attention to lubrication and, acting in unison, are doing work on a machine which will provide accelerated tests of wheel-bearing greases. If practical, such apparatus should be helpful in assuring better wheel-bearing lubrication.

Steering Gears

Improvements have been made in both cam-and-lever and worm types of steering gears. Particular attention has been given to ease of operation, rugged construction, and safety. One manufacturer of the former type has developed a rotating cam which has proved to be a signal improvement. At times high pressures are produced on bearing surfaces of steering gears and, consequently, extreme-pressure greases are finding favor for most efficient lubrication.

Universal Joints

The introduction and present use of roller or so-called needle-type universal joints means a decided change in lubrication requirements. The old-

style grease-lubricated joint and that serviced with oil will slowly pass out of the picture, and the demand for such grease will eventually be relatively small. Mileage intervals recommended for lubrication of the needle-bearing universal joints are long, and in some cases for life of the car. The latter, however, will not generally be endorsed by those wishing best lubrication. Splines must be greased regularly, but the right type of pressure-gun grease is satisfactory. As all power from the engine must pass through the universal joint or joints, it is highly important that they be effectively lubricated.

Water Pumps

Some grease-lubricated water pumps are now being made so the bearings are not in contact with the circulating liquid. That is a good improvement, because it minimizes the danger of grease being carried to and deposited onto cooling surfaces with resulting loss of cooling efficiency. Even for such pumps, the water-pump grease should be high enough in dropping or melting point to resist the softening effect of the hot circulating liquid. Some are using an oil-lubricated water pump; but if the owner is neglectful, wear may result sooner than with grease-lubricated water pumps.

Lubricating Greases for the Chassis Pressure-Gun Grease

Even though the cars equipped with straight-hole shackles and also Tryon shackles will eventually no longer be in service, there are now many being driven every day. Consequently, those offering efficient lubrication service must have pressure-gun greases particularly suitable to individual types of shackles or, obviously better, one which will effectively care for all kinds, as stocks are thereby reduced and less greasing equipment required.

As previously mentioned, the use of the Tryon shackle led to the manufacture of semifluid pressure-gun greases which, as the name indicates, have more fluidity than those previously in use. It was also found that, if a lubricating oil of higher viscosity was used, the durability of the grease was increased. Further, such a product proved very satisfactory for straight-bolt shackles and all types of threaded-bolt shackles. Thus, it answered the need for a product suitable for all shackles.

One of the desirable attributes of a lubricating grease for Tryon and also threaded shackles is the property of feeding slowly and steadily from the grease reservoirs to the bearing surfaces. It has seemed that a little tackiness is helpful in that direction, and also assists the grease in clinging to the bearing surface. There should not be so much, however, as to cause the grease to string away at length from the fitting after the gun has been disconnected. Reference to grease reservoirs of the threaded shackles is made because the ends of the sleeves of "U" shackles hold some grease which can feed to the threads, and the same action occurs to a limited degree from the grease passages of other threaded shackles.

In view of their utility, semifluid pressure-gun greases or chassis lubricants, as some prefer to call them, have naturally grown in favor. Calcium, sodium, and aluminum bases are all being used in their manufacture. Probably some of mixed base are also offered to the trade.

Since A. J. Stevens, in about 1925, perfected a method for the manufacture of aluminum-base lubricating greases of uniformity and good keeping quality, they have gained in popularity. The solubility of the base in oil eliminates the necessity of any "tie water," and with the proper oil gives a lubricating grease of such clarity and attractive appearance that its purity cannot be questioned. That has proved a decided sales asset.

The presence of only a trace of moisture allows this product, as a whole, to serve as a lubricant, and thus increases its effectiveness. No deterioration and no hardening with age are valuable properties from the standpoint of storage and elimination of clogged fittings which are possible with other types of lubricating greases, particularly if regular greasing is neglected.

Because of the above, and because of excellent service results the volume of aluminum-base semifluid pressure-gun greases manufactured has increased each year. In addition to use as a chassis lubricant, they give fine results in lubricating speedometer and cables, oil-type universal joints, oscillating mechanism of windshield wipers, the springs, and other points where squeaks develop.

Klemgard[4], with his special laboratory service-testing apparatus, using straight-bolt and threaded shackles, has shown that aluminum-base pressure-gun greases have as good resistance to emulsion with water as calcium-base greases. That conclusion is amply supported by road service. Grease-retention tests showed a comparatively high loss at first, after which the curve flattened—with plenty of grease remaining for satisfactory lubrication. The approximate composition of semifluid pressure-gun greases is shown in Table 1.

In view of the federal excise tax on lubricating greases with a worked penetration of over 390, the summer grades of most semifluid pressure-gun greases are kept below that figure.

Most consumers have found a winter grade necessary in sections experiencing cold winter weather. It is manufactured in a lighter consistency, and generally contains an oil somewhat lower in viscosity. That grade is necessary not only from the standpoint of application—especially where closed greasing facilities are not available—but also so that the lubricating grease will not be too stiff to function properly at low temperatures.

Extreme-pressure lubricating greases for this purpose have been advocated by some; but it has been largely for sales reasons, as only heavily-loaded trucks might possibly profit by their use.

Of course, large quantities of soft cup greases and gun greases containing low-viscosity oils—also probably transmission oil—are still used for chassis lubrication. Those applying such products purchase on price only, and overlook the fact—or do not care—that their unsuitability and lack of durability cause excessive wear.

In general, automobile manufacturers, with the support of the companies making bearings, are recommending a short-fiber soda-base grease containing an oil of not less than 300 Saybolt viscosity at 100° F. for lubrication of wheel bearings.

The relatively high softening point of such a product no doubt is the primary reason for its choice—this to minimize the tendency of the grease to get over onto the brake bands.

Klemgard[4] found in his laboratory service tests that calcium-base wheel-bearing greases leaked badly in comparison with sodium-base products, with consequent development of higher temperatures. The fact remains, however, that thousands of pounds of the former have been used with satisfactory results on passenger automobiles. The instruction book of one automobile company still recommends a No. 2½ cup grease. No doubt correct application of limited quantities of a calcium-base wheel-bearing grease has a distinct bearing on the service obtained.

From the standpoint of safety, and also lubrication, the ideal combination for a wheel-bearing grease would embody good resistance to softening by heat, also a smooth texture and consistency—causing it to follow closely the bearings with a complete cushioning effect. Greatest durability would probably be obtained where the worked and unworked penetrations are fairly close together. The lubricating oil in the grease should not be below the minimum viscosity noted above, and not so high as to interfere with the grease functioning as suggested. In order to approach these desired characteristics, some manufacturers are marketing a mixed-base wheel-bearing grease containing both calcium and sodium-base greases.

Typical wheel-bearing greases on the market are covered by the abbreviated specifications in Table 2.

While pressures developed on wheel bearings of passenger automobiles are ordinarily not high, there is a growing sentiment for the use of EP wheel-bearing grease. Maag[5] has pointed out the advantages of that type for lubrication of bearings in industrial use and predicts: "Most greases of tomorrow will undoubtedly be of the extreme-pressure type."

At least one automobile company is experimenting with EP wheel-bearing grease, and has found it helpful in protecting the bearings during the break-in period. No doubt for trucks in heavy-duty service such a wheel-bearing grease would be more effective; so it might be best to give extreme-pressure properties to all wheel-bearing greases, and thus avoid the necessity of stocking another grade. "Mild" EP properties should be satisfactory, and thus the lubricants would only need to pass 24-26 pounds when tested on the Almen machine.

The work of Farrington and Davis in studying microscopically the length of fiber[6] will be helpful in classification of this type of lubricating grease, since heretofore it has not been possible to answer the question: "What is a short-fiber grease?" Most manufacturers have had to depend on the finger test of skilled grease makers.

Many rendering lubrication service do not carry a special steering-gear grease. They apply gear lubricant of either the fluid or fibrous type. While a lubricating grease manufactured specifically for that purpose gives best service, gear lubricant is fairly satisfactory—provided the housings are tight enough to hold the fluid type, and if it has extreme-pressure properties.

Resistance to channeling at low temperatures must necessarily be taken into consideration in sections having cold winters. This is very important either when a gear lubricant is used or a steering-gear grease, since it has

TABLE 1—APPROXIMATE COMPOSITION OF SEMIFLUID PRESSURE-GUN GREASES

	Soap content (maximum)	Water (maximum) (pct.)	A.S.T.M. worked penetration	Texture	Saybolt viscosity of oil content (minimum)	Color of oil
Aluminum base	11 per cent aluminum	Trace	340-380	Tacky	150 at 210° F.	Black
Aluminum base	9 per cent aluminum	Trace	340-370	Tacky	110 at 210° F.	5-6 A.S.T.M.
Calcium base	8 per cent calcium	1	340-380	Smooth	95 at 210° F.	Black
Calcium base	6 per cent calcium	1	350-400	Smooth	140 at 210° F.	8 A.S.T.M. (max.)
Sodium base	5 per cent sodium	0.25	360-390	Tacky	175 at 210° F.	Green

TABLE 2—SPECIFICATIONS OF TYPICAL WHEEL-BEARING GREASES

	Soap content (maximum) (per cent)	Water (maximum) (per cent)	A.S.T.M. worked penetration	Dropping point (minimum) (deg. F.)	Texture	Saybolt viscosity of oil content (minimum)
Calcium base	18	1	185-215	200	Smooth	480 at 100° F.
Sodium base	13	0.5	280-310	325	Fibrous	130 at 210° F.
Mixed base*	18	0.5	256-290	290	Fibrous	120 at 210° F.

*Not more than 3 per cent of calcium base; balance sodium base.

Noncorrosive EP base can be added in proper proportion to any of the above greases if an EP wheel-bearing grease is desired.

TABLE 3—SPECIFICATIONS OF SPECIAL TYPE SODIUM-BASE GREASE

Soap content (maximum) (per cent)	Water (maximum) (per cent)	A.S.T.M. worked penetration	Dropping point (minimum) (deg. F.)	Texture	Saybolt viscosity of oil content (minimum)
16	0.5	315-345	320	Extremely tacky	85 at 210° F.
The following covers a combination product referred to above:					
*16	1	235-265	280	Tacky	125 at 210° F.

*12 per cent calcium soap, and balance sodium.

TABLE 4—CHARACTERISTICS OF A SERVICEABLE WATER-PUMP GREASE

Calcium soap base (maximum) (per cent)	Water (maximum) (per cent)	A.S.T.M. worked penetration	Dropping point (minimum) (deg. F.)	Saybolt viscosity of oil content (minimum)	Color of oil
24	1	160-190	210	100 at 100° F.	3 A.S.T.M.

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As previously pointed out, the steering gear and connections should have careful and regular lubrication. Failure in any way at a critical time may easily result in a dangerous accident.

Since the demand for steering-gear greases is limited, the quantity manufactured is relatively small. General Motors Specifications 4567-M, covering an EP steering-gear grease containing 5 to 6 per cent of calcium soap, is representative of that type; 4641-M is also a special steering-gear grease, but contains no grease base. It is required to stand a load of 24 pounds, minimum, on the Almen machine. As an aid to all-year use, the Saybolt viscosities of oils used in both products is specified at 0 as well as at other temperatures. A mixed-base EP steering-gear grease suitable for all seasons except winter will need 6 per cent of calcium base and 2 per cent of sodium base with an oil of Saybolt viscosity of 190-200 at 210° F., and a worked A.S.T.M. penetration of 300-330—EP compound to be added to give the above load-carrying capacity on the Almen machine.

Of course, many still give the steering gear a "shot" of pressure-gun grease; but even if a semi-fluid type is used, best lubrication will not be obtained. This will be especially true because of the average long interval before the car is again greased.

Universal-Joint Grease

It can hardly be said that grease-lubricated universal joints have been, as a whole, efficiently lubricated. That is true; because some guns used do not develop enough pressure to handle a universal-joint grease of the proper consistency, or the individual applying it is so lazy that a product is wanted which will allow easy operation of the gun.

At the average road speed of today, a tremendous centrifugal force is developed at the universal joint or joints. This means that the lubricating grease must be very high both in cohesion and adhesion. In other words, it must cling closely to the bearing surfaces and at the same time resist being torn apart.

Softer universal-joint grease, which has been demanded by some for reasons stated above, is apt to be thrown—or rather pulled—from the joint by that centrifugal force, with resulting wear. Of course, neglect can also be a contributing factor.

In order to keep down stocks, some companies have used a combination universal-joint and wheel-bearing grease with reasonable success. However, such a product necessarily does not have the extreme stringiness or tackiness needed for the best universal-joint grease.

A special type of sodium-base grease, having a very long fiber, is manufactured for universal-joint grease, and approximate specifications of the finished grease are given in Table 3.

Road-service tests are the best criterion by which to judge serviceability of universal-joint greases.

Water-Pump Grease

Since resistance to emulsion with water is one of the main requisites of this lubricating grease, it is customary to use a calcium base in manufacturing it.

A hard consistency is advisable, as that is an aid in resisting softening by the hot circulating liquid which passes through the pump. However, the grease should not be too hard, since in the case of cup feed it may not pass to the bearings as rapidly as it should.

The characteristics of a serviceable water-pump grease are given in Table 4.

Miscellaneous Lubricating Greases

Several automobile manufacturers are still recommending a cup grease for use on the distributor. Until all go to the use of a short-fiber grease, such as a wheel-bearing grease, it is thus necessary for those greasing all makes of cars to carry a No. 3 cup grease. It should be the regular calcium base product, and particularly for this purpose it is not necessary in manufacturing the grease to use an oil higher in Saybolt viscosity than 75-100 at 100° F.

The growing use of metal-covered springs is making necessary the stocking of a graphite spring grease when complete lubrication service is offered. It should have a worked penetration of 270 to 290 A.S.T.M. The graphite spring grease that is apparently most efficient should contain 40 to 45 per cent of graphite, but others are being made which contain a much smaller quantity. Some specifications call for amorphous, and others for flake graphite—which must all pass through a 200-mesh sieve.

Progress Has Been Made, and Will Continue

Lubricating-grease manufacturing is far different now from what it was in the early days, when the grease was made in a direct-fired kettle and stirred by hand with a paddle. Now modern kettles, of open and pressure types—with efficient mechanical mixers and temperature control—are in use.

The grease maker no longer uses the finger test to determine the consistency, but depends on the chemist, who checks it by a standard method on an approved apparatus. The latter has previously analyzed the various raw materials as the first insurance of uniformity.

Grease filters are necessary equipment to be sure that only absolutely clean grease is shipped to customers. Can-filling machines not only speed up that operation, but each can is cleanly filled with the exact amount of lubricating grease. Steel drums of various sizes, lithographed if desired, have practically replaced wooden barrels and kegs.

Corrugated-fiber cases have now largely supplanted wood cases, and an automatic sealing machine is helpful in efficiently handling them. Most small shipments are made by truck now rather than by railroad.

Grease chemists have already done excellent research, which has resulted in the production of better lubricating greases than have ever been available before. That work will be continued, so that eventually we shall have the needed fundamental knowledge to come closer to answering the question: "What is lubricating grease?"

More standard methods are needed for laboratory control of lubricating greases, both by manufacturers and consumers. Subcommittee IV of A.S.T.M. Committee D-2 is actively engaged in that work. Present co-operative study and experiment are largely on methods for softening points of lubricating greases under heat and consistency of very soft products.

The National Association of Lubricating Grease Manufacturers is already functioning in a way that will be an immeasurable help in future progress of this industry.

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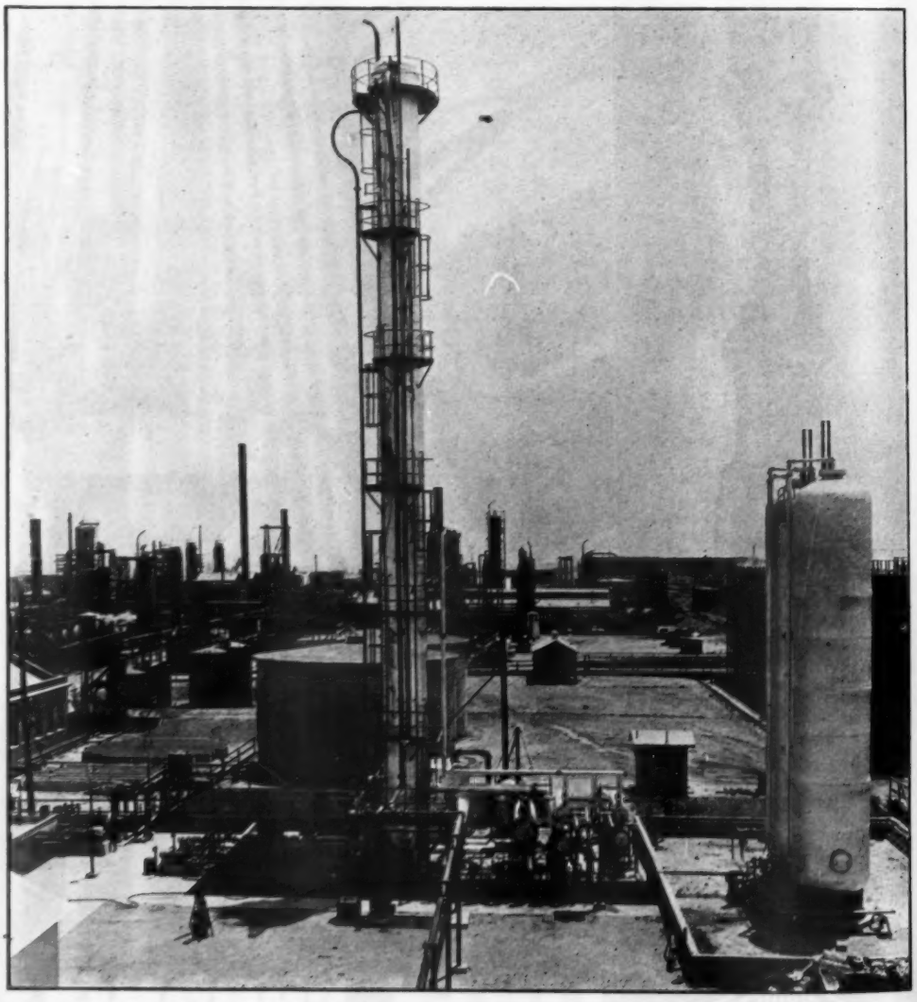
Louisiana-Arkansas Election

D. W. Harris, of Shreveport, La., vice president and general manager of the Arkansas Natural Gas Corp., was elected president of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association at the annual membership meeting. L. Mosely Moffitt replaces R. L. Gay as a vice president and Wilbur Stratton, vice president of the Standard Oil Co. of Louisiana, replaces M. W. Grimm, as vice president. J. R. Crawford, retiring president, was also elected to a vice presidency. J. S. Hasson, Ohio Oil Co., was re-elected vice president; R. F. Sebastian was re-elected treasurer.



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Above: Foot swings to compress ball. *Left:* Drawing shows piston in automobile engine cylinder starting upward to compress gasoline vapor.

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Above: Kicker's toe meets ball, compressing it. *Left:* Spark ignites gas vapor compressed by piston.

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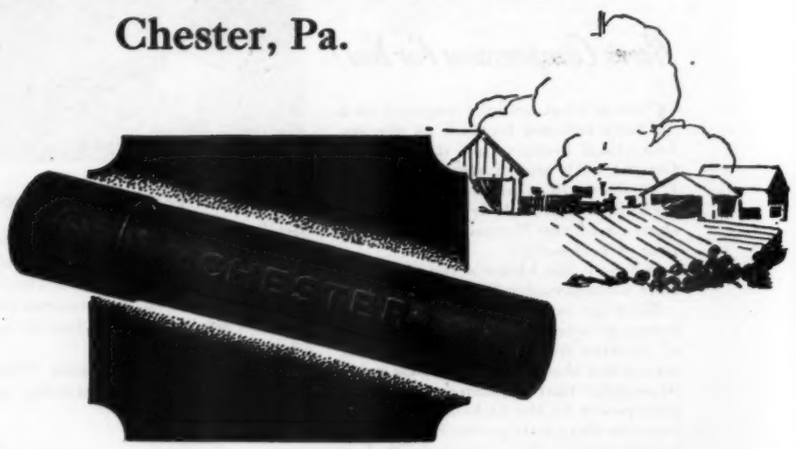

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CHESTER
STEEL CASING AND LINE PIPE

Corrosion Fatigue of Drill Pipe Is Cut By the Chemical Treatment of Mud

By F. N. SPELLER
National Tube Co.*

A.P.I.—The joint action of corrosion and stress has been found to materially reduce the endurance limit of steels. Mud conditioning as a means of protecting drill pipe against corrosion fatigue are discussed.

Corrosion, in general, is the result of reaction between the metal and its environment. The mechanism of corrosion is usually electrochemical.

Without going into technical details, it may be said that, in general, corrosion of metals in the presence of water involves two principal chemical reactions:

1. The solution of a small portion of the metal in water accompanied by a proportional deposit of hydrogen on cathodic areas, which tends to stop the reaction by polarizing the couple. The driving force that governs the rate of this initial reaction, or tendency to corrode, is the effective electrical potential of the metal to the solution. This effective potential varies with a number of factors having to do with the environment, particularly the concentration of ions in the solution, and any external electromotive force impressed on the system.

2. The removal of the hydrogen film by: (a), oxidation or depolarization; or, (b), its removal as bubbles of gas. These open the way for reaction (1) to continue. In the absence of free oxygen or other oxidizing agencies, the initial reaction in solutions that are not decidedly acid is soon stifled by polarization before any considerable damage is done.

Protective films and other factors listed on the right-hand side of Table 2 play an important part in determining the actual and relative rate of corrosion and the distribution of the attack on the metal—and, as a rule, have much more influence on the course of corrosion than the initial driving force that causes the metal to enter solution. For any specific case one or two factors, such as oxygen concentration or the tendency for films to form on the metal, usually dominate over others—and these are then called "controlling" factors. Those

Fig. 1—Corrosion-fatigue on inside of pipe

that control reaction (2) are mainly associated with the environment. Therefore, in dividing corrosion into different types, it is convenient to classify it according to the environment; so we now speak of it as atmospheric, under-water, soil, or chemical corrosion, or electrolysis due solely to stray currents. Certain specific factors have been found to control the rate of attack in each type. In atmospheric corrosion the predominant factor is the moisture; in water, the oxygen concentration and natural protective films; in soil, the contact effects, electrical conductivity, total acidity, drainage, etc. When drill pipe suffers corrosion, it is usually of the type referred to as water corrosion.

It may be seen from the above that corrosion is not a single problem, but a combination of complicated problems involving many factors, the resultant of which determines the rate and distribution of the damage. In the case of drill pipe the important factors are: Composition and heat treatment of the metal; oxygen in solution; dissimilar materials (solid or liquid) in contact; velocity of flow; soluble substances in water; nature and amount of colloids present in the mud; "rubbing" or "friction" corrosion; and variations in stress acting with corrosion (corrosion fatigue). Naturally, these and other factors do not operate separately, but one or two usually dominate, or at least modify, the action of others. The principles of corrosion cannot be discussed in detail here, but will be found in a few treatises that have been recently published on this subject[1, 2a]. However, a brief discussion of the more important factors listed above will be given with reference to the drill-pipe problem as a basis for the practical discussion of the subject.

Composition and Structure

The composition and structure of the grades of ferrous metals now used in drill pipe (including various low-alloy steels) have relatively little influence on the rate of corrosion in water or mud compared with the influence of cyclic stress, oxygen concentration, contact effects, and other factors external to the metal. This fact has been established for many types of corrosion by a large number of tests in both laboratory and field. Special steels of greater corrosion resistance, but of higher cost, are available for other purposes than for drill pipe.

Free Oxygen

Free oxygen promotes corrosion approximately in proportion to the amount present in the water by depolarizing the cathodic areas. Saturated fresh water at normal temperature and pressure contains about 9 c.c. per liter of oxygen; but, when the water is saturated with sodium chloride, dissolved oxygen is limited to about 2 c.c. per liter—but this in most cases is sufficient to keep the corrosion reactions in operation at a high rate. The facility with which oxygen diffuses to the cathodic areas is also an important factor affecting the rate of reaction between the metal and water. The rate of solution and diffusion of oxygen in water exposed to the air under normal temperature and pressure conditions is influenced mainly by the oxygen solubility, the degree of saturation of the solution, and agitation at the air-water surface. The solubility follows Henry's law[3]. Mud particles, particularly those of colloidal size, decrease the rate of diffusion of oxygen in water so long as the particles remain in suspension. The rate of transfer of oxygen through mud fluids depends upon so many variables that figures obtained in the laboratory do not necessarily apply to field conditions. Tests should be made in the field. However, the relative rate of oxygen transfer was determined qualitatively in our laboratory by the method used by Evans and Mears[4], with which tests they found that corrosion products materially obstructed the transfer of oxygen downward from the air-water surface. Our qualitative tests with drilling muds indicated that the rate of transfer of oxygen in open glass cylinders in fresh-water mud was decidedly less than in salt-water mud—about 1 to 4 in two days—and was approximately inversely proportional to the colloidal content as indicated by the relative viscosity and rate of settlement of the solids. When the solid particles in mud were permitted to settle, the rate of oxygen penetration was found to decrease very markedly when it reached the level of the precipitated material, but diffused much more rapidly through the clearer liquid. The protective effect of colloids with respect to corrosion and corrosion fatigue is discussed later in this paper.

Insufficient data are available at present on the amount of free oxygen in mud-laden fluids. The standard Winkler method, as used for determining oxygen in water, cannot be applied in this case; but the U. S. Bureau of Mines has undertaken, for the American Petroleum Institute's Committee on Metallurgy, to make oxygen determinations by the vacuum-evolution method.

Dissimilar solutions or materials in contact—such as brass, nickel steel, and ordinary steel—accelerate the solution of the less noble metal; but, in the absence of oxygen, the reaction may slow down to a negligible rate[5]. Differences in concentration of oxygen, caused by deposits on the metal or fissures such as exist between the coupling recess and the pipe, increase the rate of solution of the metal in contact with water contain-

Fig. 2—Section through cracks in Fig. 1

ing the least oxygen. This is a frequent cause of pitting. The oxygen is exhausted by corrosion when the supply is not replenished by exposure to air.

Velocity of flow usually accelerates corrosion by bringing fresh oxygen-laden solutions in contact with the metal, and is particularly harmful in accelerating contact effects when oxygen is present. We have found, when other factors were the same, that the metal subjected to the higher velocity was cathodic to the adjoining low-velocity areas; the amperage increases with the differences in velocity. Restriction of area and turbulent flow at the joint, therefore, would tend to accelerate corrosion in the pipe.

Soluble salts in water increase the electrical conductivity, and tend to increase the contact effect—especially when the anodic areas are relatively small. Here again oxygen is an important factor in stimulating the reaction. The range of

*Delivered before Los Angeles meeting, American Petroleum Institute.
Author's title: "Corrosion Fatigue of Drill Pipe."

*Figures refer to bibliography.

acidity to alkalinity usually found in muds varies from a pH of 6 to 10; and in itself, according to these tests, is not a very important factor.

Rubbing Corrosion or "Frictional Oxidation"

Rubbing corrosion or "frictional oxidation" occurs when there is a slight, but continuous, motion of one part over another with which it is in close contact over a limited area. This seems to be due to removal of the thin protective oxide or film of metal on the rubbing surfaces, and thus renders such areas anodic to adjoining parts. A groove is formed that weakens the member under alternating stresses[6]. The damage from frictional oxidation has been found to be reduced materially by plating one of the surfaces with zinc.

Strain due to cold deformation, when localized, causes the most strained areas to be anodic to other nearby areas of the same metal that are under less strain.

Corrosion fatigue[7, 8] is produced by the simultaneous action of corrosion and stress, and may be considered as a special form of notch fatigue in which the notch, instead of being formed mechanically, is formed progressively by chemical attack, accelerated by applied stress. There is probably a definite endurance limit for a mechanically-notched specimen under ordinary fatigue; but in corrosion fatigue, in which chemical action continues, obviously there can be no fixed endurance limit—except under certain conditions of corrosion and a certain number of stress cycles and time of exposure. Resistance to corrosion fatigue increases with the specific corrosion resistance of the metal to the conditions encountered, other things being equal. Under some service conditions, when the rate of stress alternation is relatively slow, it has been found that a high ductility of the metal is a significant and important factor in minimizing concentration of stress and in delaying or preventing the formation of the sharp crevices which appear as the first stage of corrosion fatigue.

In general, the fracture of a metal part due to corrosion fatigue occurs at a stress far below the fatigue limit in the absence of corrosion and when the actual amount of corrosion is unbelievably small. For this reason it is particularly important to protect all parts that are subject to alternating stress, whenever practicable, even in an environment that is only mildly corrosive[9].

Where a more durable film can be maintained on metal under cyclic stress (as in the case of stainless steel) the so-called "corrosion endurance limit" is relatively higher. Where the surface film is broken and is not self-healing, the formation of a corroded notch is accelerated by the combined electrolytic effect of concentrated stress, differential aeration, and the relatively large area of unbroken film cathodic to the metal. For example, the endurance limit for the same number of stress cycles for carbon steel of 95,000 pounds ultimate strength runs about 45 per cent of tensile strength in air, about 25 per cent in fresh water, and as low as 15 per cent in sea water containing hydrogen sulfide.

In the absence of stress, the danger due to corrosion is proportional to the oxygen concentration and other factors external to the metal; but in corrosion fatigue a very small amount of highly-localized corrosion, combined with variable stresses exceeding a certain amount, may cause considerable damage from fissures formed in the most strained area due to concentration of chemical action on lines approximately transverse to the stress. Occasionally such cracks are found on the outside of drill pipe that has been badly scored by the slips, but these cracks appear much more frequently on the inside of drill pipe exposed to mud fluid that is relatively low in colloids and high in soluble chlorides.

Colloidal material, or even fine silt, is known to restrain corrosion very materially—probably because of the adsorption of a protective layer on the metal, and reduction in the rate of transfer of free oxygen from the atmosphere and diffusion of oxygen to the metal. Possibly the cathodic depolarization reaction is reduced by adsorption of oxygen on the very fine colloidal particles.*.

*This material probably assists in building and repairing the metal-oxide film. More fundamental knowledge of the structure and formation of metal-surface films is desirable in the study and prevention of most of the corrosion problems.

Laboratory tests, with and without stress, were carried out with typical specimens of steel fully submerged in clear water and mud fluids. The results of these tests are given in Tables 3 and 4. The fluids in each case were circulated in contact with air, so that they were saturated throughout these tests with oxygen at normal temperature and pressure.

As high chloride contents break down and flocculate the colloids, for the purpose of this preliminary investigation two types of mud were used: one of which (from Barbers Hill, Texas) was saturated with soluble salts (mostly sodium chloride) and had been found to be corrosive in service; the other (from the same district) was comparatively free from soluble salts and much higher in colloids than the former.

Fig. 3—Corrosion-fatigue due to slip scores

The influence of colloids in water with widely different amounts of soluble salts, when the metal is not stressed, compared with corrosion in the same and other waters free from suspended matter is shown in Table 3.

It appears from these tests that changes in the pH value of the filtrate from these muds, which ranges from 6.2 to 9, has comparatively little influence on the rate of corrosion. The more alkaline and better-conditioned muds, however, show a much lower rate of attack—especially in comparison with tests on the filtrate from the same mud. Evidently the main protective effect in mud is due to the presence of colloids which interfere with the diffusion of free oxygen to the metal, and in some way (as will be shown later in this paper) prevent the formation of sharp pits when the metal is subjected to alternating stresses. The main influence of alkalinity in muds seems to be in keeping more or less of the fine particles in the form of suspensoids or colloids.

The fresh-water mud, with the higher amount of true colloids and with a pH of 9, showed somewhat more static corrosion than the mud high in soluble salts with the same pH—probably due to higher oxygen content in the former, but much longer endurance under the combined action of stress and corrosion, as indicated by data in Tables 3 and 4.

Results of tests on rotating specimens in the R. R. Moore fatigue machine, with specimen surrounded with various fluids indicated in Table 3 and with an applied maximum stress of 30,000 pounds per square inch, alternating from tension to compression 189 times per minute, are shown in Table 4. Grade "D" A.P.I. seamless tubing only was used in these tests from the same lot as was used in the stressless tests (Table 3). The results of such laboratory-fatigue tests give only a relative idea of the influence of colloids and other variables under these particular conditions. The actual effect of these factors should be determined in service. The particular lot of steel selected at random for these tests (Table 3) had the following chemical and physical properties, and showed an endurance limit (10^7 cycles) in air of 46,000 pounds per square inch:

Tensile strength, lbs. per sq. in.*	112,000
Yield strength, lbs. per sq. in.	64,000
Elongation in 2 in., per cent	18.7
Endurance limit in air, lbs. per sq. in.	46,000

*It will be seen that this lot is somewhat above the average in tensile strength for Grade "D" steel.

The wide variation in results obtained with different fluids, as shown in Table 4, is very significant. The samples in test No. 7, Table 4—which had such a high endurance limit in colloidal mud—showed a slight etching for about one-half inch of the most strained portion, where the stress was in excess of about 23,000 pounds per square inch, but with no evidence of notch pitting. For the study of corrosion fatigue, it would be useful to know the actual working stresses in drill pipe. Much more experimental work is necessary to determine how colloids protect metal in corrosive water and the relative influence on corrosion fatigue of other matter in mud fluids.

The influence of dissolved oxygen in salt-water mud is shown in test No. 1 compared with No. 2, Table 4. In the latter there was much less free oxygen in the mud.

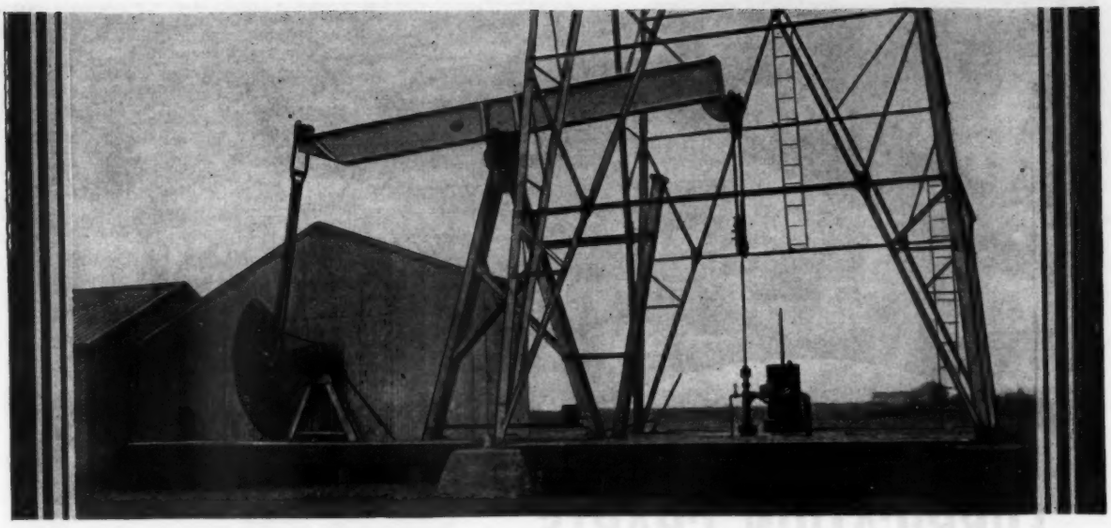
Prevention of Corrosion Fatigue

The proportion of fatigue failures of drill pipe that have originated with corrosion is probably higher than has been recognized in the past. The metallurgist of one of the leading oil-producing companies recently expressed the opinion that so-called wash-outs in the body of the pipe are often due to corrosion-fatigue cracks. Figures 1 and 2 (photos courtesy Gulf Research & Development Corp.) illustrate a typical case of corrosion fatigue which occurred when drilling a deep well through a corrosive zone of limited thickness, probably due to the mud being diluted with some unknown water that seriously reduced its protective properties. After passing through this narrow zone, drilling proceeded with the same string without further trouble.

There have been a smaller number of failures from corrosion-fatigue cracks on the outside of drill pipe, probably because of the scouring effect that tends to distribute the attack more uniformly over the metal and thus prevents pitting. A case of failure by external pitting originating in slip-score marks is illustrated in Figure 3 (photo courtesy Gulf Research & Development Corp.). In rare cases drill pipe has been known to fail within a month or two under severe corrosion fatigue.

The principles of protecting metal from stressless corrosion also apply in general to corrosion fatigue. These include: (a), The use of metal that is much more resistant to corrosion, or sufficiently plastic to prevent injurious stress concentration (such as low-metalloid nickel steel for sucker rods); (b), substantial protective coatings; or, (c), treatment of the environment so that it will not attack the metal seriously or cause the formation of fissures by electrochemical action.

The class of preventives last mentioned is apparently the most effective and economical to use in the problem under discussion, and includes mud conditioning for this purpose. We have attempted to arrest corrosion in drilling mud by the use of



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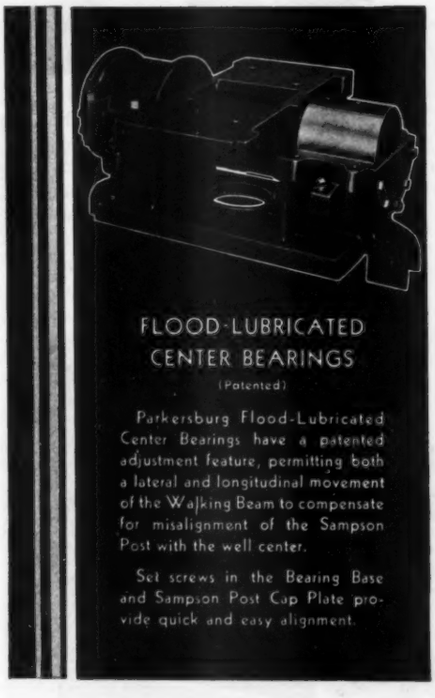
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SINCLAIR ENGINEER inspecting new ultra-streamlined "Scarab" built by Stout Engineering Laboratories, prior to charting its lubrication.

chromate passivators, which deposit a more or less protective film on the metal in various waters; but we found that the chromates were reduced by something (probably organic matter) in the mud, and soon became ineffective.

The important role of free oxygen in promoting corrosion has been discussed above. Various means have been employed to remove oxygen from water, including mechanical de-aeration and chemical treatment. In treatment of water for high-pressure boilers, it is now general practice to reduce the oxygen to about 0.03 c.c. per liter by vacuum de-aeration. Even this small amount, however, has been found harmful; and quite recently it has become the practice to add a small excess of sodium sulfite or ferrous hydroxide to take care of all the residual oxygen[8]. Sodium sulfite now costs about 3½ cents per pound in large quantities, and it is usually easy to determine whether or not an excess is present. About nine parts by weight of commercial sodium sulfite will combine with one part of oxygen to form the sulfate which is harmless. The rate of reaction between sodium sulfite and oxygen is much lower at 75° F. than at higher temperatures, and varies considerably with both the dissolved salts and the suspended particles. This is illustrated by the data obtained in our laboratory, as shown in Table 1.

TABLE 1—RATE OF REMOVAL OF OXYGEN FROM WATER BY SODIUM SULFITE

(Water saturated with oxygen before testing)

Interval after sulfite addition (Minutes)	Oxygen removed at 75°F.		Oxygen remaining at 75°F.	
	Distilled water	Sea water	Distilled water	Sea water
	(Cubic c.c. per liter)		(Per cent)	
1	5.5	2.6	16	55
5	6.2	3.1	5	47
50	6.5	4.1	0	29
240	6.5	5.6	0	3
1,440	6.5	5.8	0	0

Table 1 gives at different intervals the per cent of dissolved oxygen remaining in distilled water that originally carried 480 parts per 1,000,000 of sodium sulfite.

In many cases a concentrated colloidal mixture affords sufficient protection against corrosion without other treatment, as shown in practice; but chlorides, sulfur dioxide, and other foreign matter are apt to break down the colloids and, sometimes, increase the corrosivity of the mud fluid. In such cases a small excess of sulfite has been found to slow down corrosion without affecting the essential physical characteristics of the mud.

There are certain limitations in the use of sulfite that should be kept in mind. Of course, for the sake of economy of sulfite, the treated mud should not be agitated more than is necessary while in contact with air, and the time of exposure in the atmosphere should be limited as far as possible. The solution should have a pH of at least 8, as sodium sulfite is decomposed with the generation of sulfur dioxide and liberation of sulfur in slightly acid solutions. When sulfite is added to a solution containing considerable calcium chloride, the amount of sulfite in solution will depend on the solubility of calcium sulfite. This it limited to 43 parts per 1,000,000 at 20° C. The solubility increases slightly with the temperature. This accounts for the less favorable results indicated in test No. 6, compared with No. 2 (Table 4) under corrosion fatigue, in which the mud was purposely treated with calcium chloride and hydrochloric acid to give a pH of 6.2 to break down part of the colloids. Better means for removing or limiting the oxygen content may be found after further investigation of this problem. The amount of sulfite required in service and its practical value can only be determined by a trial in the field; but—judging by the slow rate of reaction in salt-water mud that has a fairly high colloidal content—the daily additions, after the initial amount and a small excess is added to fix the oxygen already in solution, will probably be quite reasonable.

Before making field tests with sodium sulfite in drilling mud it is, of course, important to determine, first, whether 200 or 300 parts per 1,000,000 of this salt have any effect on the physical properties of the particular mud fluid in use. A test for the amount of sulfite consumed should be made on samples of mud taken as it flows from the well (with the least possible exposure to air) and as it enters the drilling line. The difference will indicate the loss of sulfite by oxidation due to exposure of the fluid to air. Sodium sulfite is very soluble, and should be dissolved in water and added slowly to the mud at some convenient point near the pumps.

Damage from contact effects can be materially reduced by elimination of free oxygen. As previously pointed out, however, no other treatment seems necessary to prevent chemical notching and fatigue when a sufficient concentration of colloids is present in the mud—at least up to, and probably above, a working stress of 30,000 pounds per square inch.

TABLE 2—PRINCIPAL FACTORS THAT INFLUENCE CORROSION IN WATER

Factors Associated Mainly with the Metal—	Factors Which Vary Mainly with the Environment—
Effective electrode potential of the metal.	Hydrogen-ion concentration (pH) in the solution.
Over-voltage of hydrogen on the metal.	Concentration of other ions in solution.
Chemical and physical homogeneity of the metal surface.	Oxygen in solution adjacent to the metal.
Inherent ability of metal to form an insoluble protective film.	Rate of flow of the solution in contact with the metal.
	Protective films formed on metal.
	Temperature.
	Cyclic stress (corrosion fatigue).
	Contact between dissimilar metals or other materials.
	Colloidal contents of water.

TABLE 3—LABORATORY CORROSION TESTS WITHOUT STRESS

No.	Corrosive fluid—	Material:	Average penetration (Mils per yr.)
1.	Drilling mud containing 25 per cent NaCl treated with Aquagel and NaOH (pH 9.0)	A.P.I. grade "D" steel	0.07
		S.A.E. 3140 (nickel steel)	0.18
2.	Filtrate from above (pH 9.0)	A.P.I. grade "D" steel	2.75
		S.A.E. 3140	3.45
3.	No. 1 mud + 2 per cent $CaCl_2$ and HCl (pH 6.2)	A.P.I. grade "D" steel	0.24
		S.A.E. 3140	0.25
4.	Filtrate from No. 3 (pH 6.2)	A.P.I. grade "D" steel	2.91
		S.A.E. 3140	3.01
*5.	Drilling mud low in soluble salts well conditioned with Aquagel (pH 9.0) (diluted with 30 per cent distilled water at laboratory to decrease viscosity)	A.P.I. grade "D" steel	0.45
		S.A.E. 3140	0.69
6.	Fresh water (dissolved solids 250 parts per 1,000,000) (pH 9.0)	A.P.I. grade "D" steel	16.75
		S.A.E. 3140	10.57
7.	Drilling mud originally low in soluble salts diluted with 30 per cent distilled water and treated with HCl (dissolved solids 1,100 parts per 1,000,000) (pH 6.2)	A.P.I. grade "D" steel	2.33
		S.A.E. 3140	2.89
8.	Fresh water (dissolved solids 300 parts per 1,000,000) (pH 6.2)	A.P.I. grade "D" steel	24.17
		S.A.E. 3140	20.70

*These tests without stress were carried out for comparison with results of corrosion-fatigue tests in similar fluids given in Table 4. Clean test pieces (1¼"x2"x1/16") were supported in open 600-c.c. beakers containing the fluids which were mechanically stirred at 130 r.p.m. for 30 days at room temperature.

TABLE 4—CORROSION-FATIGUE TESTS

No.	Corrosive fluid—	Range of pH	Average number of cycles to failure	Time to failure under 30,000 lbs. alternating stress (Days)
1.	Drilling mud containing 25 per cent NaCl treated with Aquagel and NaOH (same as No. 1, Table 3)	8.0-9.2	1,254,600	4.61
2.	Mud No. 1 treated with a minimum of about 200 parts per 1,000,000 sodium sulfite	8.8-9.2	4,934,100	18.10
3.	Filtrate from mud No. 1 (same as No. 2, Table 3)	8.8-9.2	830,700	3.05
4.	Drilling mud saturated with salt (No. 1)+2 per cent $CaCl_2$ and HCl (same as No. 3, Table 3)	6.2	1,199,800	4.41
5.	Filtrate from mud No. 4 (same as No. 4, Table 3)	6.2	834,700	3.07
6.	Drilling mud No. 4 with sodium sulfite	6.4	1,299,200	4.77
7.	Drilling mud low in soluble salts well conditioned with Aquagel (diluted with 30 per cent distilled water) (same as No. 5, Table 3)	9.0	10,000,900 without failure	36.7
8.	Fresh water (dissolved solids 1,570 parts per 1,000,000) (comparable with No. 6, Table 3)	8.8-9.2	654,100	2.4

Conclusions

1. To avoid corrosion or corrosion fatigue on the outside of drill pipe, the metal should be protected from transverse scoring. It is also advisable to seal any openings at the joints as has been done by fusion welding. This practice not only prevents access of corrosive fluid, but also stiffens the joint so that it is stronger—and there is less tendency for "rubbing" or "frictional" corrosion to develop.

2. Contact effects and changes in velocity at the joints should be avoided as far as possible.

3. The present practice of conditioning fresh-water mud, so that a high and stable colloidal content will be maintained, also protects the metal against corrosion and the chemical formation of notches under stress to a great extent. The alkalinity should be kept near the upper limit required for this purpose. To prevent corrosion, more field experimentation is desirable on the treatment of drilling mud.

4. When soluble salts or other material are encountered that prevent satisfactory mud conditioning by their tendency to break down and flocculate the colloids, the useful life of metal under corrosion fatigue can probably be increased by reducing the free oxygen with an excess of 100 to 200 parts per 1,000,000 of sodium sulfite. If possible, this excess of sulfite should be maintained at all times and controlled by tests at suitable intervals.

5. Agitation of the mud-fluid stream in contact with air, and settlement of mud particles, both increase the rate of solution of oxygen from the atmosphere. To prevent settlement, therefore, the mud should be caused to flow at the surface with the least amount of agitation in contact with air.

Acknowledgments

We are indebted to J. Edgar Pew, vice president of the Sun Oil Co., and members of his staff for their co-operation.

Before starting these experiments the problem was discussed, and helpful suggestions were received from engineers of the Humble Oil & Refining Co. and the Gulf Oil Corp., and others. We also wish to express our appreciation to H. H. Farnham, of the Baroid Sales Co., for securing and testing samples of mud.

The experimental work referred to in this paper was carried out by A. W. Simpson in the research laboratory of the National Tube Co.

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(Given as a guide to further study of various phases of the subject.)

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Petroleum Refiners View Development of High-Speed Diesel Engine Fuel

By WM. MENDIUS, W. AINSLEE and C. H. SCHLESMAN*
Sinclair Refining Co. Socony-Vacuum Oil Co., Inc.

The compression-ignition engine was invented in Germany in 1892 by Dr. Rudolf Diesel. During the past 35 years development of the engine has proceeded in an orderly fashion, until at the present day this type of equipment is recognized as one of our important forms of prime movers.

While many of the mechanical problems which were met in the gradual evolution of the Diesel engine have been solved by brilliant research and invention, many of the chemical and economic problems which originated with the demand for large quantities of Diesel fuel have been given but scant attention.

Doctor Diesel set himself to the task of developing an engine which might be operated upon fuel of the crudest sort. Hence, he was not faced with any difficulty in finding a large variety of fuels upon which his invention might be operated.

The large stationary and marine Diesels, following the path mapped out by their inventor, were of necessity designed to operate upon available fuels, since they were required to compete with the steam engine which employed low-priced coal or the cheaper bunker oils.

The development of the compression-ignition engine proceeded slowly during the first years of the present century, approximately 4,000,000 horsepower† of Diesel engines having been built between 1900 and 1932. During the past three years the field of usefulness of the compression-ignition engine has changed. Between 1932 and 1935 the American public became conscious of the possibilities of the compression-ignition engine, with the result that about 700,000 horsepower† additional of engines was created. The latter engines differ from their predecessors in one important respect: they are small, lightweight engines—the so-called high-speed Diesel engines.

The manufacture of thousands of the new type of prime movers immediately created a demand for a fuel which was adapted to the requirements of the new engines. The first Diesels of the high-speed type were forced to run upon whatever fuel was at hand; since, in most cases, the designers were so tied up with the problem of producing them as rapidly as they were demanded that little time was available for studying the fuel which they would be required to consume.

To protect themselves from certain injurious fuels which were responsible for failures of some of the earlier engines, the engine builders soon drew up fuel specifications which were, in effect, simply descriptions of a particular fuel which the factory had found to be satisfactory. This relatively unsatisfactory condition was remedied recently by a few of the builders through the adoption of more intelligent specifications, based upon actual investigations.

A.P.I.—Modern high-speed Diesels require a carefully prepared fuel for successful operation but due to the great variety of specifications, widespread adoption of this type of machine is limited. Here the author suggests that advantage be taken of existing distribution systems for use in distributing Diesel fuel

In 1932, however, the situation was still almost intolerable. At this point the American Society for Testing Materials stepped in with the aim of bringing the builder, the fuel producer, and the consumer together. This resulted in the A.S.T.M. Diesel-Fuel Committee, which set up a tentative classification in 1934.

TABLE 1—DIESEL FUELS
(A.S.T.M. Classification)
(Abridged)

	No. 1-D	No. 3-D
Flashpoint, °F. (minimum)*	115 or legal	150
Pourpoint, °F. (maximum)†	35	35
Viscosity, Saybolt Universal, at 100° F., sec.	32–50	32–70
Carbon residue (maximum), per cent	0.2	0.5
Ash content (maximum), per cent	0 02	0.02
Water and sediment (maximum), per cent	0.05	0.1
Sulfur (maximum), per cent‡	1 5	1 5
Cetene No.	50	40

*Minimum flashpoint, as stated or as required by local fire regulations, fire underwriters, or state laws.
†Lower pourpoints may be specified whenever required by local temperature conditions to facilitate storage and use, although it should not be necessary to specify a pourpoint of less than 0° F.
‡For intermittent service.

The society, continuing its investigation, considered the interlocking nature of the properties of petroleum in drawing up its tentative classification. The 1935 Diesel-fuel classification of fuels for high-speed engines is shown in Table 1.

The fact that these classifications prepared by the society are now available would indicate that at the present time a satisfactory position had been reached. However, the refiner who is attempting to set up distribution facilities for Diesel fuels soon finds that this is not the case; and that while many of the consumers are demanding fuels which meet A.S.T.M. classifications, engine builders are specifying special fuel characteristics which are not covered by these classifications. To complicate the condition further, a fuel that meets the requirements of one engine builder may be found to be unsuitable by another builder.

In Table 2 are reproduced some of the latest engine-builders' specifications for high-speed Diesel fuel. Reference to the table will serve to show that no single fuel will meet all of the specifications.

A review of the listed engine-builders' specifications shows that it is practically impossible for the refiner to produce fuels to meet the demands of each engine builder. If it were feasible to produce a large number of fuels, each prepared to the specifications of one or two engine builders, the price of such fuels would be high because of high manufacturing and distribution cost coupled with small demand.

This is also a problem of the engine marketer; for a fleet operator may have two or more types of engines in his fleet, and he may not like to arrange for two or more kinds of fuel.

Not only must the agreement of specifications be considered, but the limits must be such as to permit quantity production of fuels. This point is illustrated graphically in Figure 1.

No attempt has been made to make this chart complete; however, it illustrates the point that when any one characteristic is limited, it also limits other characteristics. It can be seen that by changing the specifications away from those set up by the American Society for Testing Materials a quantity of refinery stocks is cast outside the usable range.

It is recognized that the designer of the aircraft Diesel may require a highly-specialized fuel which, of course, will be supplied at a premium price. The marketer of the automotive Diesel, however, is in direct competition with other types of power producers, and the main sales point is low fuel cost. For this reason it appears that in the future the conventional high-speed Diesel of the automotive type must be designed to be operated

*Delivered before Los Angeles meeting American Petroleum Institute. Author's title, "The Petroleum Refiner Views the Development of High-Speed Diesel-Engine Fuels."
†From L. H. Morrison, Diesel Engineering Handbook, Seventh edition.

TABLE 2—DIESEL-ENGINE-BUILDERS' FUEL SPECIFICATIONS

Builder—	M	N	O	P	Q	R	S	T	U	V
Gravity, °A.P.I.	....	....	....	30–35	26–29	....	26–36	22–34	24 or above	....
Viscosity, Saybolt Universal, at 100° F., sec.	35, min.	32	35, min.	35–40	35–40	35	34, min.	37	35–80	35, min.
A.S.T.M. distillation in °F.:										
Initial boiling point	....	....	....	....	....	....	....	....	....	....
10 per cent point	....	....	....	....	....	....	460	....	460	....
90 per cent point	....	....	....	....	....	....	675	....	675	..
Endpoint	....	95 per cent at 640	....	98 per cent at 700, maximum	98 per cent at 700, maximum	....	....	....	700	....
Recovery, per cent	....	....	....	98	98 per cent, minimum	....	....	....	98 per cent, minimum	98 per cent, minimum
Sulfur (maximum), per cent	2.0	....	0.7	0.5	0.5	2.0	1.0	0.5	0.75	0.5
Carbon residue (maximum), per cent	0.25	0.5	....	0.03	0.03	1.0	....	1.0	0.1	0 25
Ash content (maximum), per cent	0.01	....	....	0.02	0.02	0.02	....	0.5	0.02	0.02
Residue (maximum), per cent	....	....	2 0 (open cup)	....	....	....	....	....	....	....
B.t.u. per lb.	....	....	....	....	....	....	....	18,500, minimum	....	....
Cetene No.	45, min.	40	50, min.	46–60	38–48	50, min., 70 heptane	50, min.	....	50, min.	50, min.
Critical-compression ratio	....	....	8.5, max.	....	....	....	8.5, max.	....	....	....
Diesel index	....	....	....	35–46	29–37	....	....	....	....	....
Water and sediment (maximum), per cent	0.05	....	0.5	Trace	0.2	0.5	1.0	0.5	0.5	0.5

Pourpoint: The fuel must flow at lowest atmospheric temperature at which engine is operated.
Flashpoint: Flashpoint is not considered important by any of the builders, but most of them specify a minimum at 150° F., because this is the legal limit of some states for fuels used in building.

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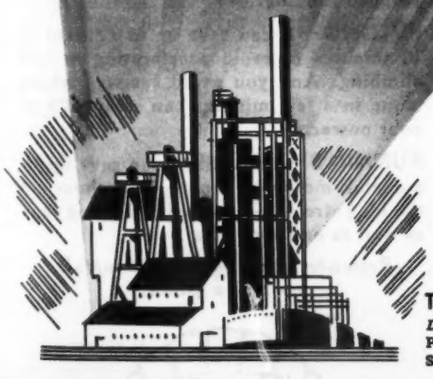

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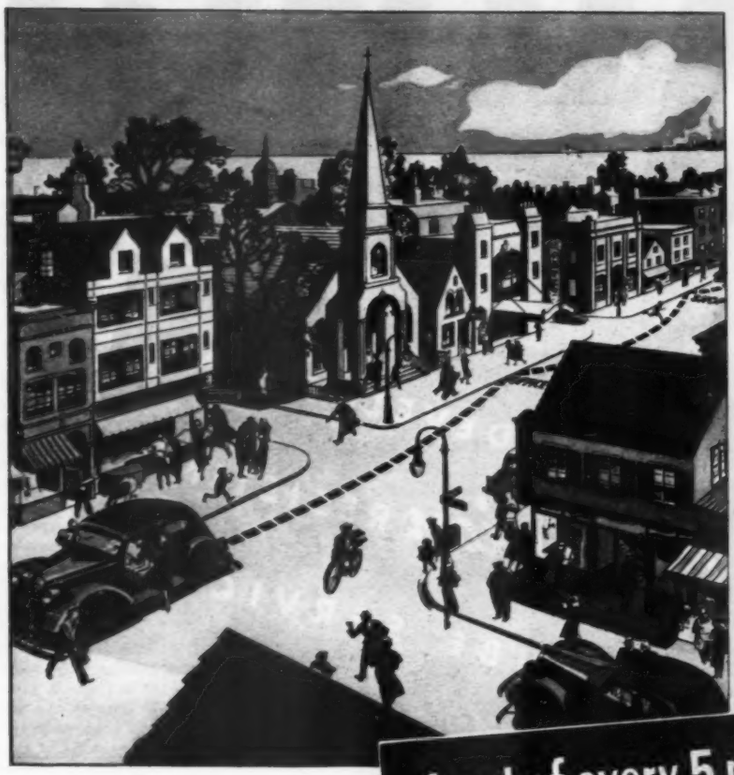
ELECTRIC FURNACE AND OPEN HEARTH • ALL STANDARD AND SPECIAL ANALYSES

Monday's marketing *can use more gasoline* than Sunday's trip



4 out of every 5 miles you drive *are stop-and-go*

Starting, Shifting and Accelerating waste money if your gasoline hasn't these 3 Different Kinds of Power

IT'S the *short* trips . . . to the grocer's, the meat market, the drug store, the bank, the department store . . . that eat up your gasoline!

This is easy to figure out when you consider that a short run from a "cold" start can use up a "mile" of gasoline . . . and that rapid accelerating can use 33% more gasoline than just rolling along on a straightaway!

To save yourself money on today's stop-and-go driving, you don't want a gasoline that merely STARTS quickly . . . or one that merely PULLS easily on hills . . . or one that merely gives good MILEAGE on long runs! One kind of power isn't enough!

What you really need is a gasoline that has *ALL THREE kinds of power* . . . Power for Starting —Pulling—Running. In short, you need a BALANCED gasoline!

Shell engineers now offer you the FIRST gasoline of this type . . . the FIRST truly balanced gasoline . . . especially made for today's stop-and-go driving.

Stop today at one of the 30,000 neighborly Shell stations from Coast to Coast. Fill up your tank with Super-Shell today and see for yourself how it can cut driving costs and save you money.

SAVES gasoline in 3 ways:

STARTING—This *balanced* Super-Shell can save up to a cupful of gasoline on every "cold" start. Even on sizzling days, your engine is relatively "cold" after it has stopped running.

PULLING—It can save up to a cupful in 10 minutes of rapid accelerating or hill climbing. And you avoid *knocking* which alone in a few minutes can waste 10% of your power.

RUNNING—Super-Shell can save up to a cupful, motorists report, in an hour on the long stretch—thus saving on long runs as well as on short trips.

Remember, when you save 16 cupfuls, you save a gallon!

Super-SHELL

Saves on today's stop-and-go driving

upon the fuel which is cheapest and, if possible, already widely distributed, to avoid adding a separate distribution charge.

Diesel fueling is faced with two distinct problems: (1) To find widely-distributed fuels for use in engines now operating; (2) to develop for the future an engine and a fuel which, when employed together, will produce power at the lowest possible cost.

TABLE 3—BURNER FUELS

(A.S.T.M. Tentative Specifications for Fuel Oils, D 396-34T)

	No. 1	No. 2	No. 3
Flashpoint, °F.	100–150 or legal	110–190 or legal	110–200 or legal
Pourpoint, °F.	*15	*15	*15
A.S.T.M. distillation in °F.:			
10 per cent point	420, maximum	440, maximum	.....
90 per cent point	.....	620, maximum	620, minimum†
Endpoint	600, maximum	600, minimum	.....
Viscosity, Saybolt Universal (maximum), at 100° F., sec.	.....	.....	70
Carbon residue (maximum), per cent	0.02	0 05	0.15
Water and sediment (maximum), per cent	0.05	0.05	0.1
Sulfur (maximum), per cent	0.5	0.5	0.75

*Lower or higher pourpoints may be specified whenever required by conditions of storage or use. Hoverer, these specifications shall not require a pourpoint lower than 0° F.

†This requirement shall be waived when the carbon residue is more than 0.07 per cent and less than 0.15 per cent.

Examination of the characteristics of currently-produced burner fuels which are available in most districts of this country reflects a possible solution of the first problem. There is reproduced in Table 3, the A.S.T.M. specifications covering No. 1, No. 2 and No. 3 burner fuels. In Tables 4, 5 and 6 actual laboratory-inspection data of a representative number of burner fuels marketed by competitive refiners during 1934 and 1935 are given. Careful examination of these data will show that like-grouped fuels are reasonably uniform.

The No. 1 fuels generally have a cetene rating between 50 and 55; they have low viscosity of about 32 sec., and they have a relatively low boiling range.

The No. 2 fuels have a somewhat higher boiling range; a viscosity range from 32 to 36, and cetene ratings approximating 45 to 50.

The No. 3 fuels approach Diesel-fuel boiling-range specifications; their viscosity ranges from 34 to 37, and their cetene rating may be classified as 40 to 45.

It is appreciated that some of these products do not meet every requirement of any single grade; e.g., one sample of No. 1 burner oil had a Saybolt viscosity of 30 sec. They all appear to be quite satisfactory with respect to carbon residue and sulfur. Their pourpoints are 0° F., or lower. They have become fairly well stabilized after several years of experience, and are not likely to change materially in the immediate future.

It has been previously pointed out that the petroleum industry is not able to develop and market as many different Diesel fuels as there are leading engine builders. Review of the builders' specifications shows that it is hopeless at the present time to market a single fuel which will meet even the majority of these specifications. Therefore, it seems necessary that the specifications be adjusted so that they can be met with a reasonable number of fuels.

It has been fairly well proved that practically all high-speed Diesels can be operated satisfactorily with a market supply of but two grades: one a light distillate, and the other somewhat heavier—the selection of which of these fuels to use to be left, to some extent to the consumer. After all, it will not be many years before the consumers will have some very definite ideas concerning the type of fuel to use.

It seems that the present supply of burner fuels offers a logical source for the present Diesel-fuel market. It must be admitted that some of these burner fuels, although excellent for their intended purpose, possess cetene ratings too low for practical use. These would automatically be excluded from the Diesel-fuel market, which would have little or no influence on their original market. The stocks acceptable for Diesel usage (those having cetene ratings of approximately 40 and higher) can be readily supplied on the basis of current Diesel-fuel consumption, without materially affecting their burner-fuel market. It is also reasonable to expect that some alteration in the characteristics of many of these fuels may take place during the next few years to accommodate both Diesel and burner-fuel requirements. Acceptance of these recommendations by the Diesel-engine builders and operators would be of material aid in stabilizing present conditions.

On an economic basis, the development of the Diesel fuel of the future should be guided by the stocks which the refiner is tooled to make without incurring additional cost. These so-called basic stocks have been divided into straightrun and cracked products. These, in the majority of cases, are distillate oils, and can be classed as clean—which is quite necessary for continuous and satisfactory Diesel operation. The burner fuels of today are generally derived from these cracked prod-

TABLE 4—COMMERCIAL NO. 1 BURNER FUELS—LABORATORY INSPECTION DATA—MIDWEST SOURCE

Sample No.—	1	2	3	4	5	6	7	8	9	10	11	12
Gravity, °A.P.I.	41.7	39.3	37.2	41.1	39.3	41.9	43.0	43.0	40.0	40.0	38.0	40.9
A.S.T.M. distillation in °F.:												
Initial boiling point	357	310	358	349	347	323	364	360	330	350	364	330
10 per cent point	397	403	392	392	416	410	377	400	385	420	384	426
50 per cent point	436	454	424	428	464	454	420	435	467	445	421	482
90 per cent point	489	508	461	484	517	498	466	485	525	475	466	537
Endpoint	545	564	504	546	565	534	498	550	590	500	503	560
Flashpoint, Pensky-Martens, °F.	142	128	144	138	142	130	115	...	125	117	...	162
Color	1½+	1+	1+	1½+	1+	1—	Prime white	...	+16	+16	0—1	6
Doctor test	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	...	...	O.K.	O.K.	...	N.G.
Water and sediment, per cent	None	None	None	None	None	None	None	...	...	...	...	...
Carbon residue, per cent	0.013	0.024	0.060	0.022	0.009	0.012	0.010	...	0.001	...	...	0.010
Sulfur, per cent	0.01	0.48	0.31	0.11	0,10	0.01	...	...	0.084	0.028	...	0 060
Aniline No., °C.	64.7	61.7	47.5	68.6	63.0	67.8	...	...	...	...	...	...
Pourpoint, °F.	Below —10	Below —10	Below —10	Below —10	Below —10	Below —10	—25	...	Below 0	—40	Flow at 25	0
Viscosity, Saybolt Universal, at 100° F., sec.	33	33	31	32	33	33	30	...	32	32.5	...	34
Cetene No.	53	51	39	50	53	54	55.9	...	55.3	44.9	...	53.5

TABLE 5—COMMERCIAL NO. 2 BURNER FUELS—LABORATORY INSPECTION DATA

	Midwest								East Coast				
Source Sample No.—	1	2	3	4	5	6	7	8	9	10	11	12	13
Gravity, °A.P.I.	38.0	39.0	37.0	35.0	36.0	35.6	32.9	37.2	36.4	35.4	35.4	31.7	38.0
A.S.T.M. distillation in °F.:													
Initial boiling point	375	375	370	375	375	330	374	327	373	369	358	375	375
10 per cent point	424	425	440	405	405	414	437	447	426	427	425	431	424
50 per cent point	501	501	512	430	...	459	473	530	476	485	477	493	501
90 per cent point	597	601	590	464	475	518	528	604	548	574	560	570	597
Endpoint	647	656	650	538	600	606	621	638	610	634	626	652	647
Flashpoint, Pensky-Martens, °F.	164	130	170	170	170	140	174	148	164	152	156	154	164
Color	Dark, 1	0—1	1½	...	...	4+	4—	2—	Dark, 2	Light, 2	Dark, 2	Dark, 3	Dark, 1
Doctor test	...	...	...	...	...	O.K.	O.K.	O.K.	...	...	...	...	...
Water and sediment, per cent	Trace	None	...	...	...	None	None	None	Trace	Trace	Trace	Trace	Trace
Carbon residue, per cent	0.01	0.02	0.02	0.006	...	0.033	0.06	0.03	0.012	0.018	0.01	0.01	0.01
Sulfur, per cent	0.08	...	0.25	0.24	0.3	0.16	0.31	0.12	0.24	0.63	0.28	0.28	0.08
Aniline No., °C.	...	...	...	...	...	51.0	47.5	71.7	57.2	60.6	56.1	56.5	68.8
Pourpoint, °F.	0	—25	0	Below 0	...	Below —10	Below —10	Below —10	Below 0	Below 0	Below 0	Below 0	0
Viscosity, Saybolt Universal at 100° F., sec.	35	33	36	32	32	33	35	33	34	35	34	36	35
Cetene No.	54.9	53.9	54.3	46.4	48.3	46	42	56	49	52	48	44	55

TABLE 6—COMMERCIAL NO. 3 BURNER FUELS—LABORATORY INSPECTION DATA—MIDWEST SOURCE

Sample No.—	1	2	3	4	5	6	7	8	9
Gravity, °A.P.I.	43.0	33.0	26.4	31.9	36.7	26.8	34.0	30.4	39.0
A.S.T.M. distillation in °F.:									
Initial boiling point	296	375	346	287	310	354	410	372	400
10 per cent point	431	432	437	431	428	444	445	418	...
50 per cent point	473	487	516	473	487	530	502	498	...
90 per cent point	532	595	620	536	553	637	605	672	...
Endpoint	638	679	704	637	618	734	694	700	625
Flashpoint, Pensky-Martens, °F.	120	172	154	116	146	162	160	170	...
Color	4½+	3½+	8+	4½+	3+	8+	3	8	...
Doctor test	O.K.	O.K.	Too dark	O.K.	O.K.	Too dark	...	...	...
Water and sediment, per cent	None	None	None	None	None	Trace	...	...	...
Carbon residue, per cent	0.036	0.056	0.044	0.035	0.053	0.070	0.050	0.070	...
Sulfur, per cent	0.22	0.65	0.60	0.24	0.14	0.59	...	0.400	...
Aniline No., °C.	44.4	54.3	37.9	44.5	61.5	42.7	...	...	...
Pourpoint, °F.	Below —10	Below —10	—5	Below —10	Below —10	—10	—25	0	...
Viscosity, Saybolt Universal, at 100° F., sec.	34	36	37	34	35	34	34	37	38
Cetene No.	40	46	36	40	52	40	47	44	...

ucts or their blends with straightrun stocks. This would indicate that the engine manufacturers may anticipate a fuel standard not far removed from current burner fuels.

Characteristics and yields of straightrun basic Diesel fuels are presented in Table 7. Likewise, data for basic cracked fuels are given in Table 8. These data are by no means exhaustive; they are, however, considered fairly representative.

The straightrun fuels, with the exception of those derived from Gulf Coastal crudes, are shown to have cetene ratings of 55 to 65, with pourpoints ranging from —10° F. to 40° F. Generally, increase in cetene rating is accompanied by increase in pourpoint. These fuels embrace viscosities from 33 to 39.

The cracked fuels also, excepting those from Gulf Coastal and some California crudes, have cetene ratings ranging from 35 to 55, pourpoints of 0° F., or less, and viscosities from 32 to 34.

While engine builders, and probably some major consumers, are familiar with the fact that fuels of high cetene rating must command a higher price than fuels of low cetene rating, they may not be as well aware of the influence of other factors upon fuel cost. Too high a cetene requirement will eliminate the greater portion of cracked Diesel fuels. Virgin oils must supply the demand.

The use of solely virgin oils introduces the pour problem for many crudes. Dewaxing operations are expensive. Year-round Diesel-fuel specifications which demand 0 pourpoint are fairly common. Since the pourpoint of a fuel is of little importance during the summer months, the demand for 0 pourpoint during warm weather results in an economic waste. A dewaxing charge may be avoided by including in the specifications separate pour limitations for winter and summer usage, preferably influenced by climatic conditions in the zone of consumption.

Virgin oils routed to Diesel consumption must also compete with the value of this stock as a source of high antiknock cracked gasoline. Prices of the respective fuels determine the economic balance.

Material narrowing of the boiling-point specifications would, by virtue of decrease in yield and added refinery-distillation processing, add to the refinery costs.

It is estimated that refinery costs alone may be increased by as much as 1 cent per gallon by imposing Diesel-fuel restrictions similar to those noted above.

The petroleum industry has established substantially nationwide distribution for two classes of fuel products, viz., motor gasoline and burner fuels. As Diesel fuel is not being marketed in any appreciable quantity for passenger or light-truck use, the use of the service station outlet is impractical.

TABLE 8—BASIC CRACKED DIESEL FUELS

(Barrels per day)

Crude—	Mid-Continent	Pennsylvania	Gulf Coastal	California	
Crude run*	1,185,000	98,000	621,000	472,000	
Cracked fuel oils—	A	B	A	B	
Yield, per cent of crude (approximate)	5-30	1-10	10	3	35	10	
Sample—	A	B	A	B	A	A	B
Gravity, °A.P.I.	36.8	28 4	40.1	32.1	28.2	32.4	16.7
A.S.T.M. distillation in °F.:							
Initial boiling point	368	368	367	360	362	425	392
10 per cent point	416	437	404	418	432	445	470
50 per cent point	468	475	470	486	468	476	523
90 per cent point	540	536	529	548	504	538	694
Endpoint	586	586	599	636	526	525	721
Sulfur, per cent	0.139	0.262	...	...	0.065	0.25	0.28
Pourpoint, °F.	Below —15		0	0	Below —15	0	...
Viscosity, Saybolt Universal, at 100° F., sec.	33 4	33.8	32.4	33.6	34.4	...	...
Cetene No.	47.5	35	54.8	43.3	20	...	...

*Refers to Table 7.

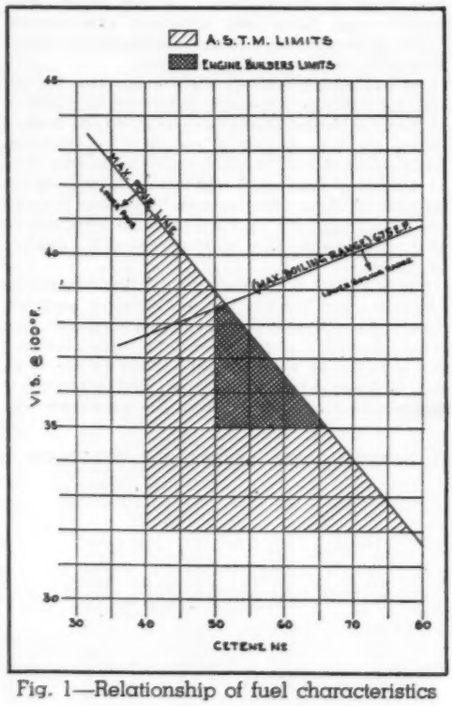


Fig. 1—Relationship of fuel characteristics

The present demands as bulk sales, in small or large volume, make it necessary for the refiner either to market Diesel fuel through its present burner-oil system or to set up an entirely new distribution system.

At the present time the industry has invested many thousands of dollars in property and equipment, which is employed in the distribution of burner fuels. This system handled upward of 35,000,000 bbls. annually, the bulk of the demand being confined to two grades. In view of the huge investment, it is obvious that the necessity of financing a similar system for Diesel fuels, although of much smaller proportion, would so retard the widespread distribution of such fuels as to serve as a deterrent to the adoption of this class of engine in all but the largest cities.

Even if the industry were able and willing to finance such an undertaking, it is evident that the investment, carrying and operating charges would, of necessity, be passed on to the consumer as part of the price of Diesel fuel.

The importance of Diesel-fuel distribution costs, as dictated by the type of fuel demanded, is reflected in Table 9. This illustrates the advantage of utilizing the system now in existence.

TABLE 9—ESTIMATED COST FOR CITY OF 100,000 POPULATION*

System—	Present burner fuel (cents per gallon)	Special Diesel fuel (cents per gallon)
Occasional purchase of 50-gallon drums—none returnable	....	5.0
Daily tank-truck deliveries from 10,000-gallon storage	0.50	†1.75
Tank-car deliveries to customer's own tanks (exclusive of freight)	0.20	†1.50

*The above estimates have been prepared for purposes of discussion only. The figures do not represent actual costs.

†The higher distribution cost incurred by the installation of a distribution system for Diesel fuels alone, as compared to utilization of the present burner-fuel system, is due both to additional investment and to lower volume turn-over.

In review, it has been brought out that:

1. The many fuel requirements as currently specified by the engine builders cannot be commercially and economically supplied.

2. There seems to be no need of supplying the high-speed Diesel-fuel market with more than two grades.

3. The demand for Diesel fuel which requires additional refinery processing and a new distributing system will appreciably increase the cost to the consumer.

4. With the co-operation of the engine builders and refiners, it is probable that burner fuels can satisfactorily supply the Diesel-fuel market.

TABLE 7—BASIC STRAIGHTRUN DIESEL FUELS

(Barrels per day)

Crude capacity*—	Mid-Continent	Pennsylvania	Gulf Coastal	California
1. East Coast	609,996	.....	.....	.....
2. Appalachian	.....	154,150	.....	.....
3. Indiana, Illinois, Kentucky	423,820	.....	.....	.....
4. Oklahoma, Kansas, Missouri	445,870	.....	.....	.....
5. Inland Texas	228,244	.....	.....	.....
6. Texas Gulf Coast	.....	.....	536,500	.....
7. Louisiana Gulf Coast	.....	.....	129,000	.....
8. North Louisiana and Arkansas	79,800	.....	.....	.....
9. Rocky Mountain	.....	.....	.....	81,975
10. California	.....	.....	.....	755,210
Total	1,886,724	154,150	675,500	837,185
Grade run†—				
	462,000 (1)	98,000 (2)	511,000 (6)	41,000 (9)
	326,000 (3)	.....	110,000 (7)	431,000 (10)
	249,000 (4)	.....	.....	.....
	92,000 (5)	.....	.....	.....
	44,000 (8)	.....	.....	.....
Total	1,185,000	98,000	621,000	472,000
Per cent of capacity	62 8	63.6	90.0	56.4

Sample: Potential gas-oil yield‡	A	B	A	B	A	B	A	B
Yield, per cent	36	29	27	32	26.0	38.0	20.0	27.0
Characteristics:								
Gravity, °A.P.I.	39.3	37.0	44.0	40.0	28.8	25.2	28 0	34.0
A.S.T.M. distillation in °F.:								
Initial boiling point	350	400	250	400	250	400	350	400
50 per cent point	465	523	464	542	505	573	475	586
Endpoint	600	700	600	700	600	700	600	700
Sulfur, per cent	0.085	0.13	...	...	0.09	0.12	0.026	0.052
Pourpoint, °F.	—10	+5	30	40	Below —25		—20	0
Viscosity, Saybolt Universal, at 100° F., sec.	35	39	33	37	34	44	34	38
Cetene No.	61.5	62	66	65	43	42	58	56

*From Bur. Mines Information Circular No. 6807 (Aug. 1934) as of Jan. 1, 1934.
†Average of A.P.I. weekly refinery statistics. The Oil and Gas Journal, Sept. 2, 1934 to Aug. 29, 1935, inclusive.
‡From assay data of individual crudes.

Average Retail Price

The average service station price of regular grade or "middle octane" gasoline in 50 representative cities was .04 cents higher on November 1 than on October 1, 1935. On November 1 the price of this grade was 13.46 cents a gallon, exclusive of all taxes, according to figures based on pump prices in cities throughout the United States.

The present price is the highest average given on November 1 since 1930, with the exception of November 1, 1933, according to figures compiled during these years. The average November 1, 1934, was 11.92 cents; thus the 1935 price is higher than that of 1934 by 1.54 cents. The present price is higher by .56 cent than the average on January 1 when the composite price was 12.90 cents a gallon.

Correct Setting Depth for Well Casing Depends on Compression Yield Point

By T. McLEAN JASPER
A. O. Smith Corp.*

A.P.I.—Importance of higher compression yield strength in the transverse direction and higher tension yield strength in the longitudinal direction are described by the author. Correct setting-depth values are indicated in a key chart based on mathematical analysis and corroborated by some 500 collapse and correlated practical tests.

The production of suitable casing pipe for deep-well operation is a problem which has become increasingly important to the oil-producing industry, because greater depths of drilling have brought to light large increases in the available oil supply—both in the United States and in other countries.

The pressure on the outside of casing pipe in oil wells is considered to be directly proportional to the depth of the well, and anything which will economically increase the collapse strength of the casing without increasing the thickness will add to the economical depth to which such pipe can be set into the ground. The most important physical property of casing in resisting collapsing pressure is the compression yield point of the steel in the direction transverse to the axis of the casing. The most important dimensional properties in resisting

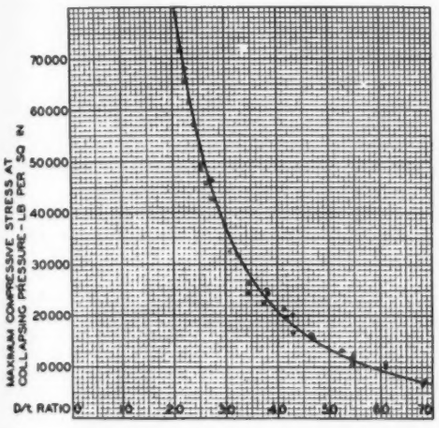


Fig. 1—The Sturm curve for collapse of long tubes, with a number of actual test results plotted to show commercial accuracy of the formula

the collapsing pressure are the diameter and thickness of the casing. These properties may be combined in the ratio $\frac{D}{t}$, or the outside diameter divided by the thickness.

As the setting depth is increased by raising the collapse value of the casing, it becomes imperative that the pull-out strength also be increased.

The generally-accepted setting-depth values, based on collapse which are accepted by the American Petroleum Institute, are—in the opinion of the author—in need of revision. These values do not conform to the test results obtained for the higher $\frac{D}{t}$ ratios, and do not accommodate the various compression-yield-point steels for the lower $\frac{D}{t}$ ratios. This paper contains a general discussion of the theory of collapse, and outlines the method for arriving at approximate setting depths for casing.

High-compression yield strength in casing can be obtained by one of the following methods: 1, using a steel with a high natural compression yield strength; 2, using an alloy steel susceptible to having the yield strength increased by heat treatment; or 3, by using steels as now applied to the industry and raising the yield strength by mechanical means.

This paper describes a casing whose compression yield strength in the circumferential direction has been increased by mechanical treatment. It also reveals that this treatment has the effect of increasing the tensil yield strength in the longitudinal direction. The increased compression yield strength in the transverse direction is equivalent to a higher collapse setting depth. The increased tensile yield strength in the longitudinal direction, coupled with the increased compression yield strength in the transverse direction, is equivalent to a greater "pull-out" strength.

Theory of Collapse

The collapse problem is very similar in principle to the column problem in that, as the casing becomes larger in diameter for a given thickness, it is analogous to a column becoming longer for a given cross-section. In the thin casing, $\frac{D}{t}$ has a quality for controlling collapse values similar to $\frac{l}{r}$ in the slender column for controlling column loads. In many other ways the analogy between the two problems can be utilized in assisting the collapse problem to its most logical solution.

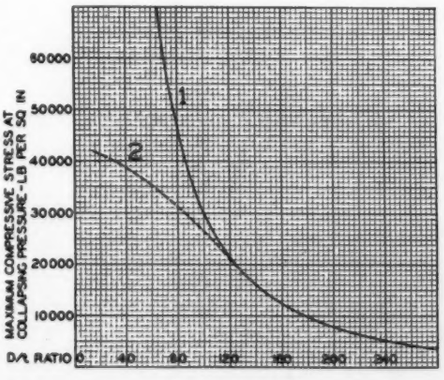


Fig. 3—Illustration of the collapse problem. Curve 1 is plotted from the Sturm equation. Curve 2 shows actual test results on a tube having a compression yield point of 60,000 pounds per square inch

The general equation of collapse — developed for long tubes by Sturm,[1a] which covers the whole problem, and which responds most closely to the physical test results on collapse — is as follows:

$$S = \frac{1}{3}\,\frac{E}{\frac{D^3}{t}}\left(\frac{N^4-N^2+a^4K^2+a^2K(2N^2-m)}{N^2(1-m^4)}\right)$$

in which, for steel, the letters represent the following:

S = stress at which collapse will occur.

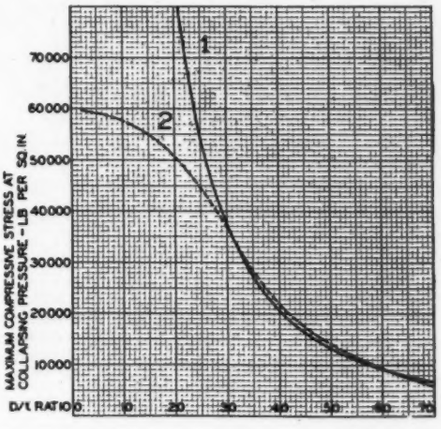


Fig. 2—Illustration of the column problem, assuming mild-steel columns with pivoted ends. Curve 1 is plotted from Eulers equation. Curve 2 shows Tetmajer's test results (yield point = 39,200 lbs. per sq. in.)*

E = modulus of elasticity = 30,000,000 pounds per square inch.
D = outside diameter of pipe, in inches.
t = thickness of pipe, in inches.
N = number of lobes in which the tube collapses, taken as 2 for long tubes.
a = a parameter for end conditions = 1 for long tubes.

$$K = \frac{\pi^2}{4\left(\frac{L}{D}\right)^2}.$$

L = length of tube, in inches.
m = Poissons ratio, taken as 0.260 for carbon steel.

For long tubes, which represent the problem of the oil-well casing, this formula can be reduced to:

$$S = \frac{2{,}680{,}000}{\frac{D^2}{t}}\ 12+K^2+7.74K.$$

The above formula has been tested out on a number of long tubes; and the results, plotted in Figure 1, attest to the commercial accuracy of the formula. This curve shows the relationship be-

* Delivered before Los Angeles meeting, American Petroleum Institute. Author's title, "Importance of Compression Yield Strength in Establishing Setting Depths for Casing."

* Figures refer to bibliography.

tween $\frac{D}{t}$ and the stress at which failure will occur, provided the yield strength of the steel in compression is considerably above the plotted stress values. The column relationship, which exists in a manner similar to that of the tube in collapse, is plotted in Figure 2. Curve 1 represents the

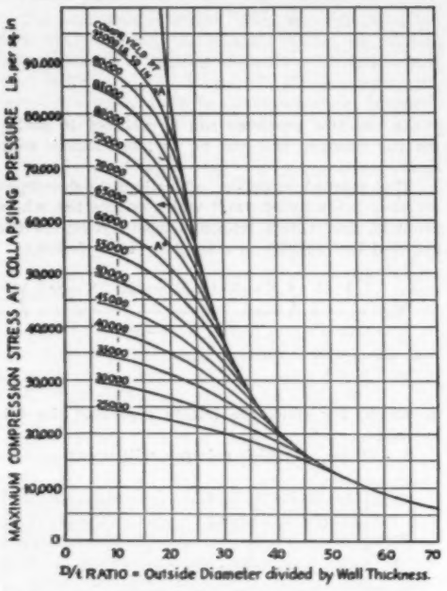


Fig. 4—Chart showing the influence of compression yield point on the collapse resistance of casings having various $\frac{D}{t}$ ratios. The envelope curve is plotted from the Sturm equation

theoretical results, while curve 2 represents the test results when they are influenced by the yield point of the steel in compression. The similarity of the two controlling equations in determining the critical stress at failure is as follows:

$$\frac{P}{A} = S = \frac{C_1 E}{\frac{l^2}{r}}, \text{ for the column problem.}$$

$$S = \frac{C_2 E}{\frac{D^2}{t}}, \text{ for the collapse problem.}$$

in which:

E = modulus of elasticity.
P = load on column.
l = length of column, in inches.
A = area of column section.
r = radius of gyration, in inches.
D = outside diameter of tube, in inches.
t = thickness of tube, in inches.
C_1 and C_2 = appropriate constants for long column and long tube, respectively.

Compression Yield Point

The problem of tube collapse is, similar to that for the column, associated with the controlling influence of the yield point of the steel in compression. In Figure 3 is shown the influence of a 60,000-pound per square inch compression-yield-point steel on the stresses at which collapse occurs, depending on the thickness ratio or $\frac{D}{t}$ value of the tube.

Curve 1 is plotted from the Sturm equation, while curve 2 represents the test results when they are influenced by the yield point of the steel in compression. A study of these curves reveals that when the $\frac{D}{t}$ value is more than 30, a steel having a yield strength in compression above 60,000 pounds per square inch is not effective for increasing the collapse value of long tubes. Figure 4 is the result of tests from three investigations as follows: Stewart's[2] test results from steel of 37,000 pounds per square inch, natural yield strength corrected for out-of-roundness; Carmen's[3] test results on perfectly-round tubes of steel having a natural yield strength of 59,600 pounds per square inch, and A. O. Smith test results on steels having natural yield strengths of 52,000, 66,000 and 77,300 pounds per square inch, respectively. These results were plotted for various $\frac{D}{t}$ values, and the curves in Figure 4 interpolated from them. Since high-yield-strength casing has been available, the 80,000 pounds per square inch curve has been verified, and several other isolated points on this diagram checked.

The method of using this chart is as follows: Suppose we have a casing pipe with a $\frac{D}{t}$ value of 20, made of a steel which yields in compression at 75,000 pounds per square inch. It is desired to determine the pressure at which it will collapse. The 75,000 pounds per square inch yield curve in Figure 4 cuts the $\frac{D}{t}$ line "20" at a stress value of 63,000 pounds per square inch (shown by an arrow). Solving for the pressure in the Lame formula, we find that:

$$P = \frac{S(R_2^2 - R_1^2)}{2R_2^2} = \frac{2S}{\frac{D}{t}}\left(1 - \frac{1}{\frac{D}{t}}\right)$$

$$= \frac{2 \times 63{,}000}{20}(1 - 1/20) = 5{,}985 \text{ lb. per sq. in.}$$

As another example:—If we test a casing pipe with $\frac{D}{t}$ value of 20, made of a steel having a yield point in compression of 55,000 pounds per square inch, it will collapse at a stress value of 47,000 pounds per square inch—which corresponds to a pressure of 4,465 pounds per square inch. In other words, assuming that salt water can develop a pressure of half pound per square inch per foot of depth, this casing pipe could be set in an oil well to a depth of 8,930 feet before collapse occurred. If a factor of safety of 2 is desired, the maximum setting depth for this casing pipe would be 4,465 feet.

If, however, we tested a casing pipe of the same size but made of a steel having a yield point in compression of 80,000 pounds per square inch, it would not collapse until the stress value was 66,500 pounds per square inch—and it could be set to a depth of 6,317 feet with a factor of safety of 2. Thus the setting depth for the 80,000 pounds per square inch steel is 41.5 per cent greater than for the 55,000 pounds per square inch steel, dimensions and other assumptions for the casing pipes being equal.

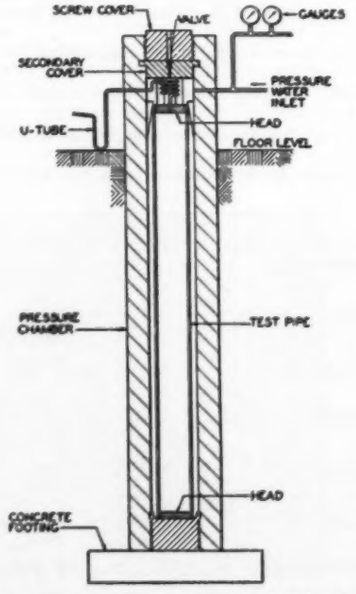
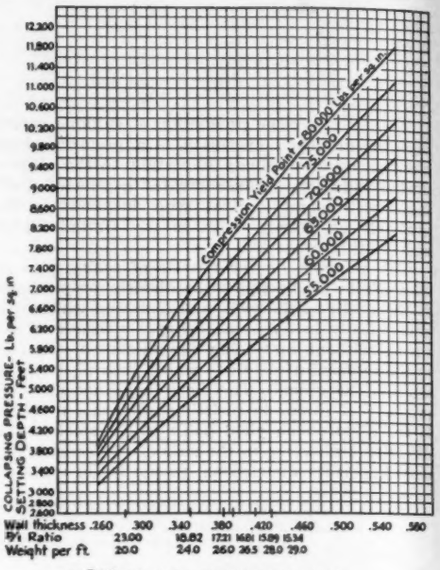


Fig. 6—Apparatus used to determine the collapse pressure for casing. Note that the ends of the specimen are closed and connected to a U-tube, the function of which is to indicate the approach of collapse


COLLAPSING PRESSURE- Lb. per sq. in.
SETTING DEPTH - Feet
Compression Yield Point - 80,000 Lb. per sq. in.
75,000
70,000
65,000
60,000
55,000
Wall thickness .260 .300 .340 .380 .420 .460 .500 .540 .580
D/t Ratio 23.00 19.82 17.71 16.01 15.09 13.14
Weight per ft. 20.0 24.0 26.0 26.5 28.0 29.0

6⅝"O.D HIGH YIELD CASING.

Fig. 5—Graph for 6⅝-inch casing, indicating setting depths for various wall thicknesses and for steels having various compression yield points

Then again, referring to Figure 4, if the $\frac{D}{t}$ value of a casing pipe is 40, and it is made of a steel having a compression yield point of 40,000 pounds per square inch, it would permit the same setting depth as a casing pipe of the same dimensions but made of a steel which has a compression-yield-point-value greater than 40,000 pounds per square inch. It will, therefore, be observed that, with certain casing dimensions (high $\frac{D}{t}$ values), an increase in the compression yield point of the steel will not contribute to the collapse resistance of the casing; while for other casing pipes, particularly those with low values of $\frac{D}{t}$, an increase in the compression yield point will greatly increase the depth to which they can be set safely. Of course, an increase in the compression yield point leaves the choice of increased safe setting depth or of decreased wall thickness for a given setting depth. This relation is shown in Figure 5 for 6⅝-inch outside-diameter casing and on the basis of various compression yield points; a safety factor of 2 has been assumed.

If this casing is made of a steel having 60,000 pounds per square inch compression yield point, then a wall thickness of 0.500 inch would permit a safe setting depth of approximately 7,880 feet. With 70,000-pound and 80,000-pound steel, the safe setting depth would be increased to 9,200 feet and 10,570 feet respectively, on the basis of the same wall thickness. On the other hand, if a setting depth of only 7,800 feet was required, then Figure 5 reveals that only a 0.432-inch wall would be needed for the 70,000-pound steel, and that 0.387-inch would be a sufficient wall thickness with the 80,000-pound steel.

Figure 4 was developed and checked by testing some 500 long tubes made of different steels and having different compression yield strengths. The apparatus used for determining the collapsing pressures in these tests is shown schematically in Figure 6. These test data are corroborated by the

TIME-TESTED

FIG. 395-D
JARECKI Wedge
Gate Valve

FIG. 410-A
JARECKI U-Clamp
Gate Valve

FIG. 1007
JARECKI Hydraulic
Gate Valve

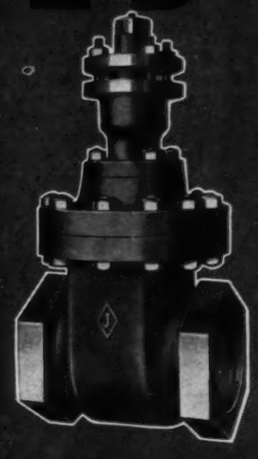


FIG. 1004-A
JARECKI Hydraulic
Self-Oiling Valve

FIG. 395-A
JARECKI Wedge
Gate Valve

FIG. 395
JARECKI Double-Disc
Gate Valve

FIG. 403
JARECKI Extra-Heavy
Gate Valve

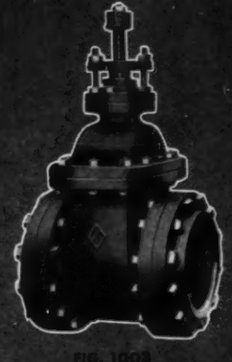


FIG. 1003
JARECKI Natural
Gas Gate Valve

Jarecki Manufactures All Styles of

IRON-BODY GATE VALVES

JARECKI makes a full line of iron-body gate valves for use on steam, oil, water and gas lines. The various types handle steam working pressures ranging from 100 to 250 pounds—oil, water and gas non-shock pressures ranging from 150 to 1450 lbs.

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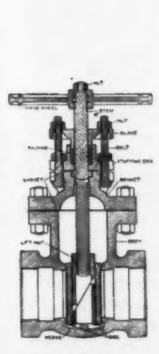
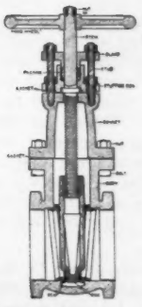
Catalogue 34 gives full particulars on the JARECKI line of valves and fittings.



Cross-Section
Double-Disc Valve
FIG. 1007



Cross-Section
Wedge Gate
Valve
FIG. 395-A

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findings of several other investigators, sometimes using slightly different testing methods. Figure 6 serves as a dependable working diagram for analyzing the problem at hand.

Method for Raising the Compression and Tension Yield Strengths

It has been shown above that the compression yield strength, more than any other physical property, influences the usefulness of any given casing pipe. Analogously, it must be generally conceded that increasing the resistance to collapse of such pipe would be of great value to the oil producer.

Casing pipe can now be treated by a radically new process whereby actual compression of the pipe raises the compression yield point of the steel in the circumferential direction. The procedure is first to manufacture casing pipe which has a larger circumference than the desired finished circumference, and which has proportionately thinner walls. This casing pipe is then compressed to the desired diameter, and at the same time the wall thickness is increased to the required dimension. The compression can be accomplished in several ways, one of which is indicated in Figure 7. This utilizes a powerful press equipped with special dies between which the casing is inserted (Figure 7).

An illustration of this principle is furnished by Figure 8. In this case a 6¼ per cent reduction in diameter by the compression treatment produced the effects given in Table 1.

These actual test results are typical, because they have been paralleled repeatedly on a number of casing specimens. Two pieces of pipe were cut from one length of casing as received from the mill, ready for service. One of these pieces was tested in its original condition; the other was compressed about 6¼ per cent before testing.

The anticipated yield was obtained by comparing, in Figure 4, the stress $\frac{D}{t}$ and the $\frac{D}{t}$ value for each test. It will be found that the yield point for the non-compressed casing is about 64,000 pounds per square inch, and that the yield point for the compressed casing is close to 95,000 pounds per square inch.

The actual yield-point values were each obtained by taking the average results of tests on four specimens cut from four different locations around the periphery of the casing. Since the compressive stress was applied parallel to the circumference of the casing, the specimens were taken in substantially the same direction. Each was three-fourths-inch long, one-half inch wide, and as thick as could be obtained from the casing wall and still have a straight specimen. Both ends were ground square with the sides and parallel with each other.

The tests were made in the usual testing machine, having hardened and ground plattens, maintained parallel by ball-supporting apparatus in order to insure uniform application of the load (see Figure 9). Considerable care was exercised in applying the load so that the center of the ball support and the axis of the specimen coincided. Successive loads, representing increased stresses, were applied—and after each application, the change in length of the specimen was measured. These data are plotted in Figure 10, and the resulting curves indicate an average yield point in compression of 91,000 pounds per square inch.

TABLE 1—TYPICAL TESTS RESULTS

	Before compressing	Compressed 6¼ per ct.
Length of specimen	8×diam.+	8×diam.+
$\frac{D}{t}$ value	19.3	17.4
Pounds per square inch—		
Collapse pressure	5,450	9,150
Stress at collapse	55,200	84,000
Anticipated compression yield point	64,000	95,000
Measured compression yield point	66,000	91,000

Tension tests were also made on specimens taken from casing pipes both before and after compression, in order to establish what effect this compression treatment had on the tensile yield strength of the steel in the longitudinal direction. By means of an extensiometer it was found that the tension yield point in a direction parallel to the axis of the pipe had been raised to a minimum of 75,000 pounds per square inch due to the treatment.

In order to utilize all of the advantages obtainable with high-compression-yield casing, the efficiency of joint strength must be given serious consideration. The question of joint design for tubular goods was very ably presented before this institute at its mid-year meeting of last year by W. C. Shutts.[4] In this paper tests on many types of joints for casing were reported, and the appropriate position of each was indicated. It is desired to quote part of his conclusion:

"It is evident that 10,000-foot wells cannot be safely and satisfactorily completed with our present A.P.I. casing program, if we are to follow our present factor of safety. Casing programs for 10,000-foot wells may be satisfactorily met by higher-strength steel, and joints of higher efficiency. The use of special alloy steels for higher-strength casing has not proved altogether satisfactory, and joints of special design and higher efficiency are now being used, and further development is under way for both casing and drill pipe."

Fig. 7—A length of casing enters the 10,000-ton press in which compression treatment is given. High-yield casing in the making

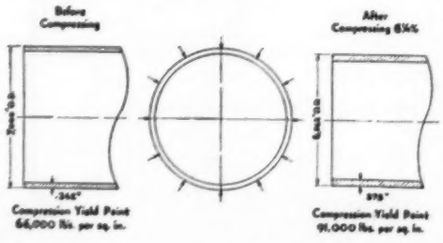
Before Compressing
After Compressing 6¼%
Compression Yield Point 66,000 lbs. per sq. in.
Compression Yield Point 91,000 lbs. per sq. in.

Fig. 8—Diagram showing the principle and the effect of the compressive treatment used in the manufacture of high-yield casing

The test results indicated that welding from the standpoint of joint efficiency has great possibilities. Most casing engineers, however, are more familiar with the threaded joint, and it is the author's purpose to indicate first the effect of high-compression yield strength in increasing the "pull-out" strength of threaded casing.

The failure of most threaded joints under "pull-out" load (except in the case of very heavy walls) occurs when the casing pipe "jumps the thread" in the coupling. What probably takes place is that the faces of the threads in the two members tend to slip relative to each other due to the angle of the thread. This slippage creates forces which have the tendency to compress the casing and expand the coupling. Measurements, taken after such a "jumping of the thread," actually show a reduction in the diameter of the casing—and usually also an increase in the coupling diameter.

When high compression is used in casing, the compressive force in the circumferential direction caused by the "pull-out" load is resisted by the casing due to its high yield point in compression. The coupling has its yield strength in tension increased to effect high resistance to "pull-out." The combination of the two produces a joint, which under "pull-out" load, develops practically the full strength of the steel in the net section area at the root of the last-engaged thread on the casing.

Tests on welded joints show much greater possibilities than will ever be attained with threaded joints, unless the threaded ends are upset generously and the couplings made thick.

The Sturm formula, which is based on the theory of elasticity, was selected for the collapse problem in the preceding discussion, because the test results on steel tubes—using various length ratios—agreed with this formula better than they did with any other formula available. It also better covers the whole field of collapse. The envelope curve in Figure 4 has accordingly been plotted from the Sturm formula, while the series of curves to its left represents actual test results for most of the yield-point values and the chart completed by interpolation. To apply a general mathematical relation for these curves would lead to a set of formulas so cumbersome that their applications to the engineering problem of deep-well casing would be impractical.

The straight-line relation, developed by Stewart[2] from his researches on lap-welded pipe, and used in the past in connection with the calculation of collapse values for casing, applies only to steels of relatively low yield point for which the test results deviate very slightly from a straight line. Stewart's work is of unquestionable value in bringing about some appreciation of the application of low-yield-strength steel to the problem of collapsing long pipes. However, for pipes of higher-yield-strength steel, and particularly those with a very high compression yield point, application of this relation is inappropriate. This is shown graphically in Figure 11 by comparing the values obtained by different methods of calculation for certain grades of casing.

The American Petroleum Institute, in Supplement No. 1 to A.P.I. Code No. 5, adopted October 1933, has taken Stewart's results and multiplied them with factors of 1.38 for grade "C" and 1.745 for grade "D" casing, respectively. As an example, this has resulted in giving a setting depth for 13⅜-inch 48-pound grade "D" casing of 1,313 feet. Yet proper interpretation of Figure 11 shows that the maximum setting-depth value that can be expected for any casing of these dimensions is about 970 feet. In other words, for $\frac{D}{t}$ ratios above 30, grade "D" casing cannot meet

the setting-depth values given in the above mentioned supplement. However, it will be noted that grade "C" casing conforms very closely to the supplement values for $\frac{D}{t}$ ratios above 30.

Considering $\frac{D}{t}$ ratios below 30, it will be found that the setting depths given in the supplement can be obtained, but not by using steels having the minimum yield-point values specified for grades "C" and "D" casing; i.e., higher-yield-

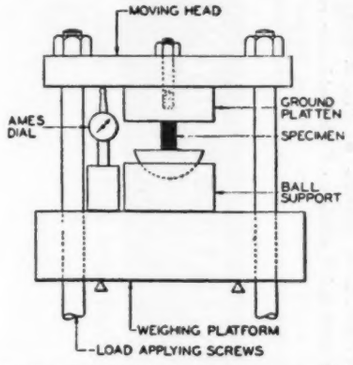

Fig. 9—Schematic drawing of the equipment used for compression tests. Note that accurate centering of specimen is important

strength steels would have to be used to meet these values.

It should be pointed out that, when nominal values of diameter and wall thickness are used for computing test results, these may fall above or below the appropriate curves, due to the commercial tolerances allowed. It is understood that equivalent tolerances apply to setting-depth values.

The first recorded work on collapse dates back to 1858, when W. Fairbairn[5] discussed the resistance of tubes to collapse. In 1888 G. H. Bryan[6] presented the results of his testing to collapse of a long thin pipe under external pressures. He also advanced an elastic formula for the critical pressure, which resolves into the following values for the critical stress at collapse or failure, but deals only with theoretically very long thin tubes:

$$S = \frac{C_1E}{(1-m^2)\frac{D^2}{t}} = \frac{C_2E}{\frac{D^2}{t}}$$

in which:

E = modulus of elasticity, in lb. per sq. in.
m = Poissons ratio.
D = outside diameter of pipe, in inches.
t = thickness of pipe, in inches.
C_1 and C_2 = appropriate constants.

The solution of stresses in a curved beam under pressures, normal to its curvature, had been considered independently by M. Levy[7] at about the same time as Bryan. Later Timoshenko,[8] in his paper on the stability of elastic systems, helped this analysis along to determine the critical values of such pressures. This analysis was further developed by him to apply to the buckling of circular tubes, and he gives the equation which can be reduced to the following formula:

$$S = \frac{C_1E}{(1-m^2)\frac{D^2}{t}} = \frac{C_2E}{\frac{D^2}{t}}.$$

Similar to the Bryan and Timoshenko formulas, and if a length of infinte value is assumed, the Sturm general equation also reduces to:

$$S = \frac{C_1E}{1-m^2} = \frac{C_2E}{\frac{D^2}{t}}.$$

And, for the higher $\frac{D}{t}$ values, little deviation can be found between the curve plotted from this formula and the envelope curve in Figure 4.

There are other investigators who have gone into the general question of the expansion of the mathematical analysis for short tubes; but, since the problem of casing pipe is not involved by this expansion, no reference to these investigations need be considered here.

However, the deep-well problem is not one in which infinite length need be considered; nor is it one in which large $\frac{D}{t}$ values are crucial. The maximum length between stiffeners or couplings at present is about 40 feet, and the minimum length is about 20 feet. For deep wells the average $\frac{D}{t}$ ratio is about 20. The general formula by Sturm is best adaptable for casing pipe; and its application has, therefore, been carried for-

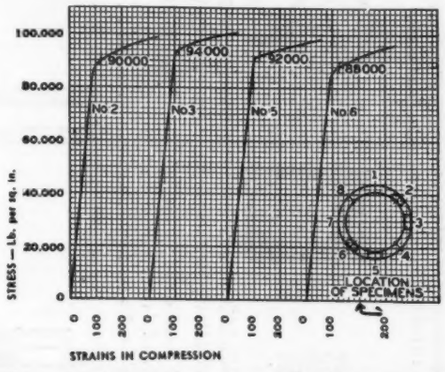

Fig. 10—Stress-strain diagrams for compression test bars from a high-yield casing. On the right is shown the locations around the periphery from which these test specimens were taken

ward in the preceding discussion. In it special emphasis has also been given to the theoretical elastic considerations in order to make it clear that the envelope curve in Figure 4 cannot be exceeded, either in tests or in service, as long as the values are representative of deep-well collapse problems, in other words, for $\frac{L}{D}$ values in excess of 8.

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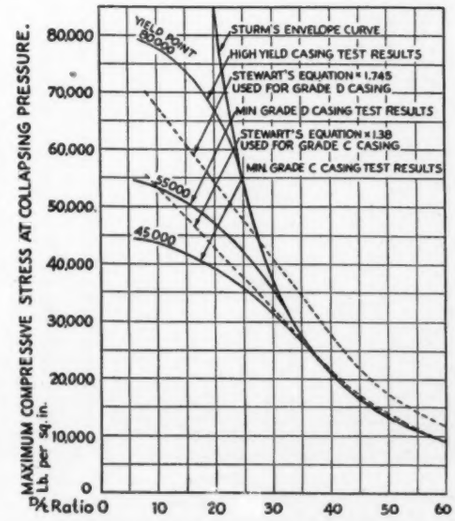


Fig. 11—Curves for collapse of A.P.I. grades "C" and "D" casing, as well as high-yield casing, comparing the results of different equations

Dr. E. R. Weidlein Receives Chemical Industry Medal

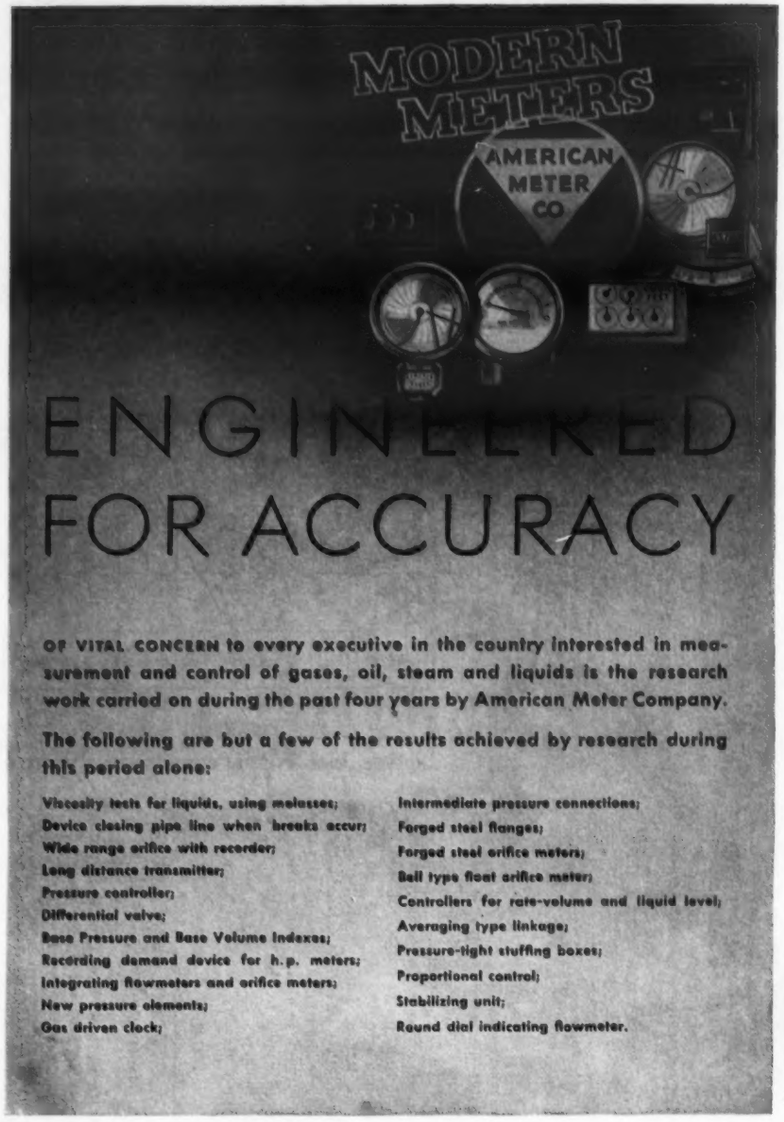
The Chemical Industry Medal for 1935 was presented this week to Dr. Edward R. Weidlein, director of Mellon Institute of Industrial Research, Pittsburgh, Pa., at a meeting of the American Section of the Society of Chemical Industry, held

DR. E. R. WEIDLEIN

at the Chemists' Club, New York City, on Saturday. The meeting was held jointly with the American Chemical Society. Dr. L. V. Redman first gave a short talk outlining the accomplishments of Doctor Weidlein that had merited this award. The presentation was then made by Dr. D. D. Jackson of Columbia University.

In accepting the medal Doctor Weidlein told about some of the scientific investigations at Mellon Institute that were evidently accorded recognition in the award of the medal.

On July 10, 1916, Doctor Weidlein came to Mellon Institute as assistant director; on October 1, 1916, he was appointed associate director and was acting director throughout the World War. On March 12, 1918, Doctor Weidlein was appointed chemical expert for the War Industries Board and on October 8, 1921, Doctor Weidlein was appointed director of Mellon Institute, and since then he has devoted his exclusive time and attention to the duties of that office. He is also vice president of the board of trustees of the institution as well as a trustee of the University of Pittsburgh. Doctor Weidlein is the author of a large number of scientific papers and articles on industrial research achievements, opportunities and procedures, and with William A. Hamor, of a popular treatise entitled "Science in Action," a book that describes industrial research methods and successes.



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Integrating flowmeters and orifice meters;
New pressure elements;
Gas driven clock;
Intermediate pressure connections;
Forged steel flanges;
Forged steel orifice meters;
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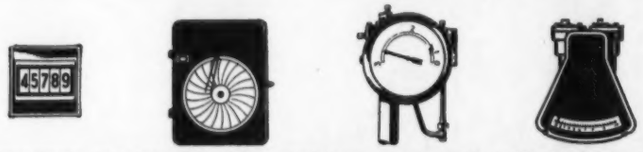

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Oil Industry Challenges Comparison of Service With That of Government

By AXTELL J. BYLES
President, American Petroleum Institute*

Petroleum products are, next to food, clothing and shelter, the most essential commodities to present day society. It is therefore natural the public should be profoundly interested in the question of the adequacy of supply.

During the past 20 years some 11 official surveys of petroleum reserves have been made. Usually the later estimates have exceeded the earlier ones notwithstanding the ad interim withdrawals from underground storage.

In 1925 the Institute appointed a committee of eleven to make such a survey and its work was published in a volume entitled "American Petroleum—Supply and Demand." Now, a decade later, the conservatism and wisdom of that study are amazingly vindicated. The Institute has considered it wise to bring the 1925 survey down to date, forecast the demand for the next 25 years, make another study of petroleum reserves, and broaden the scope of the original survey by adding chapters on transportation, refining, marketing, taxation and labor.

If it were a fact, as has been so frequently, vociferously and erroneously alleged, that our petroleum reserves will be exhausted, at the rate of present use, in 8, 10 or 12 years, the public might be justified in taking drastic action to conserve them, perhaps even to the point of largely shutting in our own production and opening wide the gates to imports. That would certainly conserve American supplies. Happily, both for the public and the industry, no such need exists.

The 1925 survey indicated 5,321,000,000 bbls. of crude oil in proven underground reserves capable of recovery by production methods then in use. The committee of eleven wisely pointed out, however, that there remained unexplored 1,105,454,459 acres in which the geological formation indicated oil might be found. It further pointed out that supplies yet undiscovered would be found at much deeper levels under pools already producing, and elsewhere. It drew our attention to coal and oil shale deposits from which petroleum, or its derivatives, could be extracted to supply the nation's requirements for centuries to come.

Twelve Billion-Barrel Reserve

Since the survey of 1925 we have produced and consumed 8,692,000,000 bbls. of petroleum and today we have, according to informed and conservative estimates, 12,177,000,000 bbls. in proven underground reserves recoverable by present methods of production. The industry, as predicted, has discovered vast reserves of crude oil at lower levels and is now finding production as deep as 11,000 feet as against 7,500 feet at the time of the 1925 survey. Furthermore, it is capable of drilling to 15,000 feet, with present equipment. It has learned to restore reservoir energy to old pools and maintain it in newer fields through controlled gas-oil ratios, to repressure with air or gas and to use a water drive, thus permitting the recovery of vast amounts of oil from the sands which, with the technique of even a decade ago, would have remained unrecoverable.

The present survey, referring to reserves contained in bituminous coal and oil-bearing shales, calls our attention to the fact that today in England and Germany gasoline is being produced from coal and lignites at a cost varying from 10 to 15 cents a gallon. A substantial amount of the motor fuel is now being so produced in those countries. These processes are relatively in their infancy. Can there be any doubt that with progress in the art, and increase in volume, production costs will be reduced? This illustrates a fact proved by history, namely, that need and price will either produce the required quantity of any essential product, or will produce a substitute for it. Rapid advances in science suggests that the question may some day be not "how long will our supply of petroleum last," but rather "how can we use our supply of petroleum."

The importance of these facts, from a public interest standpoint, is, however, the absurdity and evil of loose statements, to the effect that our crude reserves are rapidly reaching the point of exhaustion. Such statements, though they are absurd, are not vicious if made as a result of misapprehension of the facts. They are vicious, however, if they are merely used for the purpose of frightening the people and their legislative representative into federal control of this industry.

Scientific Proration

With a single exception or two, the great oil producing states have enacted conservation laws, encouraging scientific proration of production to prevent the waste of reservoir energy, aiding in voluntary unit operation of pools and in the recovery of the greatest amount of oil per acre at the least cost.

In certain pools the application of the acreage factor in proration constitutes a difficult problem. None will assert that because an owner holds less than the per well acreage, determined by the state authorities as proper for the pool, such owner should be deprived of his full pro rata share of the oil. On the other hand, equity and justice dictate that such an owner should not be permitted to take more than his pro rata share of the oil. In other words, take his neighbor's share. Recovery of the greatest amount of crude oil at the lowest cost is conservation in production. It serves both the public interest and the industry. The law of capture conflicts with such orderly, low-cost and high-yield production and consequently with the public interest.

That the producing states have authority under their police power to protect the public interest in this regard I have no more doubt than I have that they will, with the cooperation of the industry, find an equitable way to do it since they have overcome as perplexing problems in the past. Exchanges and consolidation of acreage to attain requisite drilling blocks should be made whenever possible. The state authorities are in a position to encourage this through their power to grant or refuse drilling permits and to act as friendly arbiters.

Congress, at its last session, exercising its exclusive jurisdiction over interstate commerce, passed a law interdicting shipments of petroleum produced in violation of state laws (the Connally Act—S.1190), thus supporting the states in their control of production, which is within their exclusive jurisdiction.

At the same session congress also gave its consent to an Interstate Compact for the conservation of petroleum and natural gas entered into by six of the producing states. It is hoped that all of the remaining oil producing states will soon give their adherence to this compact.

Congress did not legislate upon the subject of imports. Its consideration might well be given to making permanent the Connally law (S.1190), which expires in 1937, and adding thereto a section providing for federal regulation of imports to some percentage of relationship to domestic production, so long as this may be necessary to effect the balancing of supply with consumption.

The current survey, which gives careful consideration to the various items affecting demand, indicates that in 1950 we will require a daily crude oil production of 3,041,000 bbls., this demand declining by 1960 to 2,926,000 bbls. per day. In the demand forecast every domestic requirement is provided for, including motor fuel, lubricants, fuel oil, and the multitudinous other products of petroleum. There seems no present reason to doubt that the industry will be able to provide this production of natural crude oil over the period indicated and no one now knows for how many decades thereafter. Should natural crude oil become not available in sufficient quantities, or at a competitive price, it would be gradually supplemented by production from bituminous coal and then, as we now foresee it, by production from oil-bearing shales. However, that time now seems more remote than it did a decade ago. Should that day come the motor fuel obtainable from coal alone would be measured in hundreds of billions of barrels while oil shales would yield an estimated potential production of 108,000,000,000 bbls. of crude oil. The latter alone at the present rate of consumption would take care of our needs for a century.

Contribution of Refiner

The contribution toward conservation, by improved technique, in the producing branch of the business is difficult to measure in millions or billions of barrels, though the aggregate during recent years has been large and is ever increasing. The contribution of the refiner of crude oil toward conservation can be measured fairly accurately. By the cracking processes alone 6,600,747,000 bbls. less crude oil have been required to serve the public over the past 15 years than would otherwise have been required. This is equal to 75 per cent of the total crude oil produced during the last 10 years. Cracking is the major contribution of the refining industry along this line, though it is but one of scores of practical contributions of these modern refineries which house the laboratories where magicians work. One of these, of recent development, though already in commercial operation, is known as polymerization. By means of it, gasoline is manufactured from refinery as well as natural gases without the use of crude oil.

Progress along these lines is constantly being made under the drive of competition and the free incentive of individual initiative and reward, which is the heart of the American system. A brief way to sum this up is to state that to have produced the 1934 domestic motor fuel requirements by refining processes used in 1917 would have required 1,909,000,000 bbls. of crude oil. However, the industry actually met those requirements by refining 895,636,000 bbls. of crude oil and sold

*Delivered before Los Angeles meeting, American Petroleum Institute.

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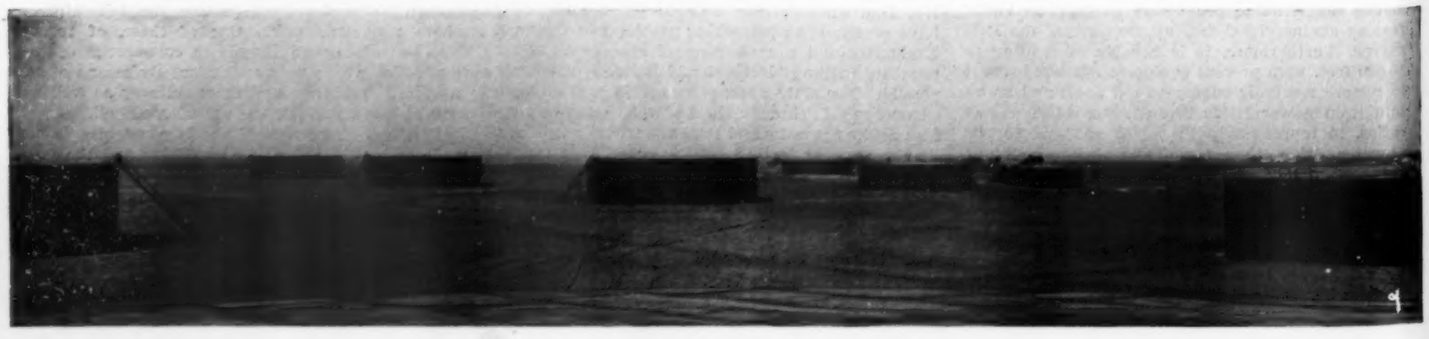

a better quality of gasoline to the public at about half the price charged in 1917. This is real, as contrasted with theoretical or bureaucratic, conservation. It is not the result of governmental compulsion but of economic and competitive urge, the rendering of a service with the hope of earning a profit. Economic incentive removed, initiative is destroyed, and drifting is substituted for progress.

Pipe Line System

It is unnecessary to describe to this audience the unique and low-cost transportation system which has been created by the petroleum industry to meet its peculiar needs. This includes 140,000 railroad tank cars which, together with package shipments, furnished about 10 per cent of the total tonnage freight revenue of our railroads; 130,000 motor trucks serving the consumer of petroleum products; 390 tank ships, which comprise about 20 per cent of America's entire merchant marine tonnage; coastwise and inland waterway tonnage; and 112,000 miles of pipe lines, which are integrated refinery facilities. These could not have otherwise been built or continue long to operate. Speaking of pipe lines, Prof. Harold Rugg, of Columbia University, in his recent book, "An Introduction to American Civilization," says:

"This great pipe line system is called the 'underground railroad of the United States.' If all the petroleum which moves through these pipe lines in a year were loaded in barrels or in oil tank cars to be hauled by railroad, it would make up a train 40,000 miles long, which would stretch once around the earth and two-thirds of the way around again. Yet this enormous tonnage is moved so quietly and invisibly under the ground that most people know nothing about it."

Pipe line rates are under the jurisdiction of the Interstate Commerce Commission and state public service bodies. It is interesting to note that during the 29 years the pipe lines have been under the jurisdiction of the Interstate Commerce Commission but two complaints have been filed against any phase of their operations. One in 1921, when tariff rates and minimum tenders from the Mid-Continent area to Pennsylvania were attacked. The other, in 1934, when a protest was made against reductions in rates voluntarily established by certain pipe lines. This protest came from a group of nonintegrated refiners who felt that their competitive position in the markets would be prejudiced by the lower rates.

It tempts one, in view of the suggestions made from time to time that pipe lines be divorced from refining operations, to inquire as to just who would be benefited by such action. Would it be the producer of crude oil, who now finds a market for his oil at his well? Would it benefit the owners of the tens of thousands of stripper wells where gathering costs are high and frequently service is rendered at a loss to the pipe lines? Would it be to the interest of the nonintegrated refiner, where changes in pipe line tariffs may enlarge the marketing area of his urban integrated competitor? Would it be to the interest of the public, when higher pipe line rates and increased cost would inevitably become necessary to enlist capital for the construction and maintenance of nonintegrated lines to new fields without assurance of a supply at one end or a market at the other?

The marketing chapter of the survey will show an amazing service anticipating the needs of our motor vehicles, which increased in number from 8,000 in 1900 to nearly 26,000,000 in 1935, by supplying an estimated total of 80,000 bbls. of gasoline in 1900, 79,949,000 bbls. in 1918, 232,745,000 bbls. in 1925, and 410,339,000 bbls., or 17,234,000,000 gallons, in 1934. During this period gasoline changed from a byproduct to a luxury, and then to an every-day necessity. This growth raised problems more rapidly than they could be solved. There has been, nevertheless, a constant improvement in quality and service and a lowering of prices.

Undoubtedly, the distribution of products presents in all industries one of their most perplexing problems. The petroleum industry, in common with others, is faced with difficulties in marketing which are challenging. Because we are so close to these problems, we undoubtedly feel that they are more serious than those of other industries. Perhaps they are. One thing is certain: they must, and can only, be solved by the industry operating under normal economic laws, for we can no more avoid these fundamentals, without serious consequences, than we can the law of gravitation.

There is not a moment of the day or night when the law of diminishing returns is not working. Each additional filling station means less gallons per pump for existing stations. Fortunately, while retail outlets continue to be established, the pace is decelerating.

Concomitant with occasional suggestions for the divorcement of pipe lines are suggestions for the divorcement of retail marketing from refining operations. It is as violent an assumption to state that a manufacturer can be deprived of his legal right to sell his product at retail as it would be to state that he can be deprived of his legal right to sell his product at wholesale. It is easily conceivable, however, that should the present margin policy and imposition of penalty chain-store taxes on filling stations continue, segregation of retail marketing from refining would come about.

Segregation Problems

This possibility raises several interesting questions. Suppose retail marketing were segregated from refining, what then would be the situation? Gasoline would be supplied to the retail marketers by those refiners who could deliver the best product at the lowest cost. There would be no margins. There would remain no so-called "leaders" who would set prices for their own products to be undersold by their competitors. In fact, the supplier would have no competitors so far as retail marketing is concerned as he would leave that field of combat to a purely retail merchandising trade and the business would be conducted as any other retail trade, such as boots and shoes, meat

Half way to California. When The Oil and Gas Journal's train stopped at Las Vegas, New Mexico, Fred Cook of the Sinclair Prairie Oil Company, Frank B. Long of the Oklahoma Natural Gas Company, E. H. Moore of the E. H. Moore Company, W. S. Fitzpatrick of the Consolidated Oil Corporation, and W. N. Davis of the Phillips Petroleum Company, in the order shown, agreed to being shot together

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and clothing, and both the law of diminishing return and the law of survival of the fittest would prevail in this, as in other retail marketing.

These remarks are not to be construed as a recommendation to any one or a prophecy but rather as a conjecture as to what would occur if present trends continue. Should this conjecture prove to be correct, we would then learn how many unneeded retail outlets there are and, in the long run—and it probably would not be very long—the answer to this question would become apparent through the lessening of uneconomic outlets.

The Institute's vice president for marketing is going to discuss with you the draft of a marketing code upon which he has been conferring with the industry for several months. He hopes to present this code to the Federal Trade Commission for its approval.

Desirable and helpful as would be a simple set of rules, such as this code contains, interdicting certain unfair marketing practices, I wish to state:

1. There is no disposition on the part of the Institute to impose a code.

2. Unless a code can be evolved which will have the practically unanimous adherence and wholehearted support of the marketing branch of the industry, there should be no code.

Interstate Compact

In some quarters skepticism is expressed as to the value of the Interstate Compact to conserve oil and gas. This, upon the theory that it is a cooperative and not a mandatory movement. The answer seems to be, first, that there is no power under the federal constitution for the federal government to control the production of oil, which is mining, any more than the refining of oil, which is manufacturing. That power is reserved to the states. The compact is the democratic, as distinguished from bureaucratic—the economic, as distinguished from the political—way of solving our problem. If conference between the petroleum-producing states, which are in close touch with their local conditions and advised as to the national requirements, cannot handle this situation, democracy fails. Inherent in the plan are the "potentialities for regularizing the industry without regimenting it; for assuring conservation without destroying competition; for protecting initiative and enterprise; for ending the demoralizing alternation of flood and drought; and for insuring the fullest possible recovery from our reserve of petroleum."

Governor Landon is quoted recently to have said "The oil industry in the oil-producing states has an opportunity for cooperation under the Interstate Compact which never before existed. Taking full advantage of this opportunity and sincerely cooperating, one with the other, to solve the problems of the petroleum industry, will assure this business of self-government and the elimination of federal bureaucratic control."

California has made remarkable progress toward the liquidation of surplus inventories during the past year. While expressing our appreciation of the hospitality of this great and attractive state, may we not express the hope that its legislature and its petroleum industry will unite in finding, by the enactment of a sound conservation measure, a permanent solution of its problems of over production of crude oil. There is no section of the country which, from the standpoint of both the public and the industry, would derive greater benefit from proper conservation of this priceless heritage. May we not also express the hope that California, upon the enactment of a conservation measure, will become a party to the Interstate Compact, thus cooperating with her sister, oil-producing states in serving national as well as local interests.

Notwithstanding the predictions of the prophets of disaster, when the Supreme Court declared the National Industrial Recovery Act to be unconstitutional, the statistical position of the industry has not only continued strong but has improved. Here is an evidence of industrial self-government, supported by fine cooperation from the conservation authorities in the majority of the producing states. It is incumbent upon these authorities and upon the industry to see to it that this improvement continues. Refiners are apparently studying the forecasts furnished by the Bureau of Mines. The Interstate Compact is setting up its own fact-finding body and the Institute will, in addition to its other statistical service, continue, so long as there seems to be need for it, to publish in its Quarterly a statistical review similar to that published in pamphlet form on August 12. With this data before it, the producing and refining branches of the industry will well serve both the public and themselves by governing their operations according to economic needs, with full weight given to seasonal requirements.

The demand for gasoline during the first nine months of this year has averaged about 6 per cent above the like period of 1934. Inventories of finished and unfinished gasoline at the end of September are estimated to have been 50,500,000 bbls., compared with estimated economic requirements of 51,110,000. These inventories totaled 53,160,000 bbls. a year ago.

Crude oil inventories September 30, 1935, were approximately 320,000,000 compared with 349,407,000 bbls. a year ago, indicating satisfactory progress toward liquidation of surplus crude. These figures compare with the 313,244,000 bbls. in storage as of November 30, 1926, the lowest point established in recent years.

The price of 63-70 octane Oklahoma gasoline was quoted at 5.625-5.75 cents per gallon f.o.b. refineries on October 14. A year ago middle bracket gasoline was selling at Oklahoma refineries at from 4.125 to 4.625 cents.

The price of 36-degree Mid-Continent crude oil continues at $1 per barrel where it has remained since attaining that quotation in September, 1933.

There are now pending in congress bills which, if enacted, would mean the end, or at least the beginning of the end, of the petroleum business as a private industry. In addition to those bills dealing exclusively with petroleum, your attention is drawn to the Mahoney Bill (S. 3363)—now in the senate committee on interstate commerce. This is, in many ways, the most startling bill introduced in the present congress. It provides for a federal licensing system for all business engaged in interstate commerce, ignores state lines, and practically every power reserved to the several states under the federal constitution, and every liberty of the individual citizen, placing supreme authority over all of them in a commission at Washington. This bill deserves the very serious consideration and active attention of all of our citizens, regardless of their business or vocation.

It is a matter of profound regret that the pending Cole Bill (H.R. 9053) contains a section which would create a federal board supervising the industry in an advisory way. The reason that this is objectionable is obvious. With such a federal board created, each conflicting interest in this vast and highly competitive industry would be appealing for relief. It is not within human probability that such appeals would not sooner or later result in a request by the board for legislative authority to take mandatory action. One such act would inevitably require others and, provided such legislation were constitutional (which in most cases we believe it would not be) the industry would soon be regimented, managed and controlled by a political bureaucracy in Washington. This, in my opinion, would as surely follow as federal control of crude oil production, provided for in the pending Thomas Bill (S. 2027)—assuming but not admitting its constitutionality—would inevitably lead to attempted control of refining and marketing.

A. E. Butts and Dr. W. McLean Jasper, of the A. O. Smith Corporation, lay aside problems in metallurgy as they step out of the Journal's train for a few minutes

As the months pass, it is becoming clearer to the industry that one cannot have his cake and eat it. Beyond the exercise of the police power of the several states over the conservation of crude oil and natural gas, government should not and cannot go unless it regiments and attempts to operate the whole industry by a board or bureau in the national capitol. Any one with the slightest practical experience in this, or any other, great business, knows that such procedure would bring ruin to all concerned and the public should be shown its vital interest in the matter. We will either have a competitive, private industry to serve the public or we will have a socialized industry to serve the political bread line.

Against Federal Control

Regardless of the different economic situations of individuals and companies within the petroleum industry, and regardless of the differences of opinion, by reason thereof, which exist as to internal policies, I believe it can be stated, without fear of contradiction, that on this question of federal control the industry is united against it almost to a man. There should be no breach in the wall, no overconfidence, no failure to guide our every act from the standpoint of the public welfare.

We know a good many things about this industry that the public does not but should know. The public, particularly within the past two or three years, has been given much misinformation concerning the industry. The public and its representatives in congress should know that throughout three-quarters of a century the industry has never faltered in supplying an abundance of the multitude of essential petroleum products, of steadily improving quality at steadily reduced prices. They should understand that so far ahead as the mind of man can run there is no possibility of a failure of this supply. That long after those of us now living have rested from our labors, the time may come when the practically endless reserves contained in bituminous coal and oil shales may be called upon to supplement natural crude oil production. No student of this subject believes for a moment that when that time comes such supplies will not be forthcoming at prices which will permit their fullest use.

This industry is made up of human beings. Neither it, nor any of them, are perfect. Measured in terms of national service in good times and in bad, it need have no embarrassment in a comparison of its record of service to the public with that of any other group or industry. Perhaps we may be permitted to call attention to the fact that during the depression this industry has not been a suppliant for federal relief. On the contrary, it has contributed at the rate of over $1,000,000,000 a year in the form of taxes to the support of government, which equals 11 per cent of all federal, state and local tax receipts. It increased employment 37 per cent from the depression low point, at the same time shortening working hours 30 per cent and raising the wages of its employes. These wages, in purchasing power, stand today at practically the 1929 peak. Has government itself made a comparable record in administering its own affairs? Does the history of any government in any business lead us to believe that it would improve upon this record? Why single out the oil industry for federal control?

Important as is the oil industry to those engaged in it, America itself is infinitely more important. The sole measure of permanent recovery is private reemployment. Employment given by government is not recovery. It is relief. It is the duty of this industry to continue to maintain its high rate of employment, its liberal wage scale, and good working conditions, and to be thoughtful and conservative in its operations, keeping them within sound economic requirements in order that it may continue to render the maximum service to the nation. This it can and will do unless the federal government prevents it.

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H. S. Hammond, National Tube.
Charles P. Holmes, Western Actuarial Bureau.
A. W. McKenney, National Supply Co.
V. F. Taylor, Peerless Oil & Gas Co.
A. M. Brereton, Pure Oil Co.
Herman C. Schutt, Alco Products.
T. E. Ward, Oil Field Equipment Co.
Amos L. Beaty and Mrs. Amos L. Beaty, New York.
Ross C. Powell, Texas Co.
O. P. Cottrell, Texas Co.
W. R. Berger, Southland Royalties.
John H. Moran, L. L. Davis, Walter Miller, G. F. Smith, J. J. Cosgrove, Belt H. Lincoln and H. K. V. Tompkins, Continental Oil Co.
C. O. Willson, The Oil and Gas Journal, New York.
C. R. Farmer, The Oil and Gas Journal, Chicago.
W. G. Skelly, Richard T. Lyons, A. F. Winn, W. T. Atkins, Emby Kaye, Virgil Marshall, T. R. Goebel, James W. Vaiden and F. T. Hopp, Skelly Oil Co.
C. H. Wright, Sunray Oil Co.
Allen J. Edwards, Black, Sivalls & Bryson.
J. Garfield Buell, Buell-Herndon Co.
H. R. Leland, Leland Equipment Co.
Neil Buckley, Cities Service Export Corp.
W. S. Fitzpatrick, Consolidated Oil Corp. and Mrs. W. S. Fitzpatrick.
C. S. Powers, Republic Steel Co.
Ira Duggan, Conservation Department, Oklahoma, and Mrs. Ira Duggan.
Frank Long, Oklahoma Natural Gas Co.
Charles R. Krause, Lee C. Moore Co.
Fred Cook, Sinclair Prairie Oil & Gas Co.
A. J. Scherer, Sinclair Refining Co., and Mrs. A. J. Scherer.
John Mayo, Mayo Hotel.
Gordon Fisher Jr., Spang Chalfant Co.
H. G. Texter, Spang Chalfant Co.
C. A. McCollum, National Supply Co.
D. G. Mann, National Supply Co.
Dale Moore, Dale Moore Co., and Mrs. Dale Moore.
Frank Hinderliter, Hinderliter Tool Co.
William B. Way, International Petroleum Exposition.
Rush Greenslade, Gypsy Oil Co., and Mrs. Rush Greenslade.
Fred E. Cooper, Fred E. Cooper, Inc.
J. E. Richards, National Tank Co.
James H. Baker, Merco Nordstrom Valve Co.
Ted R. Miller, Taubman Supply Co., and Mrs. Ted R. Miller.
A. E. Butts, A. O. Smith Corp.
T. McLean Jasper, A. O. Smith Corp.
H. L. Dickson, Parkersburg Rig & Reel Co.
J. E. Johnson, Tide Water Oil Co., and Mrs. J. E. Johnson.
Wirt Franklin, Wirt Franklin Petroleum Corp.
W. L. Connelly, Sinclair Prairie Oil & Gas Co.
A. E. Bradshaw, National Bank of Tulsa.
J. J. Boyd, Stanolind Pipe Line Co.
A. J. Kerr, Merco Nordstrom Valve Co.
E. J. Liggett, Johns-Manville Corp.
William N. Davis, Phillips Petroleum Co.
W. K. Warren, Warren Petroleum Co., and Mrs. W. K. Warren.
H. E. Felt, Warren Petroleum Co., and Mrs. H. E. Felt.
J. A. LaFortune, Warren Petroleum Co., and Mrs. J. A. LaFortune.
Charles Flint, Tulsa Rig & Reel Co.
Deck Wilmoth, Steel Derrick Manufacturers Association.
P. C. Lauinger, The Oil & Gas Journal.
E. Klappenbach, The Oil and Gas Journal.
R. Otis McClintock, First National Bank & Trust Co. of Tulsa.
Elmo Thompson, First National Bank & Trust Co. of Tulsa.
Oscar Townsend, Chicago Great Western Ry., and Mrs. Oscar Townsend.
C. V. Milliken, Amerada Petroleum Corp.
D. A. Sikes, Baroid Sales Co.
D. M. Hammett, Axelson Manufacturing Co.
J. J. Larkin, Larkin Torpedo Co.
Paul S. Hedrick, Tulsa World.
Hal Gruber, Union Wire Rope Corp.
J. P. Flanagan, Independent Producer.
E. H. Moore, E. H. Moore Co., and Mrs. E. H. Moore.
R. W. Simpson, Independent Producer, Ada, Okla.
G. M. Welling, E. H. Moore Co., and Mrs. G. M. Welling.
K. R. Teis, E. H. Moore Co., and Mrs. K. R. Teis.
Virgil Hicks, E. H. Moore Co., and Mrs. Virgil Hicks.
A. G. Tydings, E. H. Moore Co., and Mrs. A. G. Tydings.
Levi Ackley, E. H. Moore Co., and Mrs. Levi Ackley.
Mac Q. Williamson, Attorney General of Oklahoma, Oklahoma City.
W. T. Holloway, attorney, Interstate Compact Commission, Oklahoma City.
C. C. Brown, Assistant Conservation Officer of Oklahoma.
W. J. Armstrong, Conservation Officer of Oklahoma.
Sam Battles, Chairman, Conservation Commission of Oklahoma.
Art L. Walker, secretary, Interstate Compact Commission.
Claude Barrows, Daily Oklahoman.
Judge Earl Foster, attorney, Corporation Commission of Oklahoma.
G. Raymond, Black, Sivalls and Bryson, Oklahoma City.

Left to right: F. M. Phillips, superintendent at welding for H. L. Price Co. on Phillips line at Sanford, Tex.; H. L. Lemons, president of Bradley & Lemons Construction Co., and Felix Johnson, petroleum engineer, Phillips Petroleum Co. at Borger, Tex.

West and North Texas

By
L. E. BREDBERG

WINKLER COUNTY EXTENSION IS FEATURE IN PERMIAN BASIN

FORT WORTH, Tex., Nov. 11.—Two more extensions to new pools in Winkler County, a wildcat Ordovician abandonment in Kimble County, and abandonment of other outpost and wildcat tests were the features for West Texas this week.

Sun Oil Co.'s No. 1 Walton, in section 8, Block B-3, about 1½ miles southwest of the nearest producer in the Keystone area of Winkler County, appears as an extension to that pool since showing 700 feet of oil on a drill stem test made from 3,238-3,405 feet during the week. It was afterward drilled to 3,454 feet and pipe run preparatory to testing. Seven-inch was cemented at 3,238 feet. It has been running about 300 feet lower structurally than other wells in the Keystone Field, but will probably make a producer irrespective of that fact.

A rank wildcat, 3 miles due east of Kermit in Winkler County also is showing for a producer and is now being tubed preparatory to testing. It filled 1,500 feet with oil with the hole standing at 3,303 feet, encouraging the owners. It is in the northeast corner of section 2, Block 5, and is an abandoned test drilled several years ago before production was found in the Howe and Halley areas east of the Hendricks field. Small production was found in a well in section 4, in the same block and survey, about 2 miles to the west, but was of no commercial importance and no other tests were drilled in the area to prove a field. This new well may prove yet another field for the county—or an extension to the Brown and Altman area just south of the town of Kermit.

Brown-Altman Area

One mile southeast of the Brown and Altman producers Cree and Hoover appear to have a dry hole in their No. 1 J. A. Crow, in the southwest quarter of section 14, Block B-5. It is shut down at 3,270 feet waiting orders after showing only 2 bbls. of oil with 2½ bbls. of water per hour from bottom of the hole. It evidently hedges in the Howe-Halley producing trend on the east.

Production in the Brown and Altman area south of Kermit and the Hendricks pool to the west, is being drawn nearer by the Humble Oil & Refining Co. on its Walton lease in section 48, Block 26. The company's No. 3-A Walton, 1,980 feet from the south and west lines of section 48 flowed 271 bbls. of oil in 10½ hours after shooting with 300 quarts of nitro from 2,900-3,120 feet. The company's No. 1-A Walton, in the same section, recently bridged a considerable gap between the two producing areas which appear sure to link by production.

Thurman and others' No. 1 Seth Campbell, in the SW cor. section 18, Block B-3, promises another extension or pool opener to the northeast of Kermit 1¾ miles and about three-quarters of a mile west of an old small producer in section 17. This new possibility topped the pay at 3,121-73 feet and logged an increase in oil at 3,252-72 feet and is now shut down to run casing and test. It is about 2½ miles northwest of the Wilgo-Campbell well mentioned and may prove a separate pool or another extension to the Howe-Halley trend although a separate pool appears more likely of being established. Both tests will be closely watched to note what develops for the outpost area. All of the prospective wells mentioned help to make Winkler County one of the most interesting counties in the entire district, the old producing county establishing a comeback after several years with but little attention and interest being shown it.

Location in Yoakum County of Davidson and Honolulu Oil Co.'s strike, and surrounding lease owners. Total depth is 5,090 feet

Ector County

One outpost test and a rank wildcat were slated for abandonment in Ector County during the week. Continental Oil Co.'s No. 1 Wight, located in section 21, Township 1s, T.&P. Survey, nearly 1½ miles southwest of the most southwesterly extension of the Cowden field was abandoned at a total depth of 4,495 feet after plugging back to 4,435 feet and shooting with 200 quarts of nitro without success.

Sun Oil Co. and Atlantic Oil Producing Co.'s No. 1-B Holt, section 6, Block 43, Township 1n, T.&P. Survey, approximately 2 miles north of the Cowden field and a mile east of the same company's first small extension producer for this area is drilling at 4,160 feet after striking water at 4,100 feet, with an estimated 1,000,000 feet of gas. Signs look discouraging for this test which may rim the north end of the field near the Andrews County line.

Westbrook Oil Corp.'s No. 1 Yarbrough and Allen, located in section 26, Block B-14, on a Gulf Production Co. block in the extreme southwest corner of Ector County, will probably be abandoned at a total depth of 4,195 feet after striking stinking water at 4,180 feet. Location is 11 miles due west of the Penn field.

Jones Dry Hole

D'Arman and Sheldon's No. 1 Huffaker, in section 25, D.&D.A. Survey, about 3 miles northwest of the newly discovered Luecders pool in eastern Jones County, was given up at a total depth of 2,168 feet. Elevation is 1,560 feet. It was drilling in search of the King sand which pays off in the Luecders pool to the southeast.

Andrews Duster

L. G. Stogner's No. 1 Mrs. Cora George, in section 25, Block A-22, in the northern part of Andrews County, and about 7 miles northwest of the Means pool, was given up this week at a total depth of 5,108 feet although having encountered several good showings of oil, all of which proved non-commercial in production. Elevation is 3,253 feet and it topped the lime at 4,385 feet. It has been one of the most interesting tests in the district due to the showings of oil and gas logged.

Ordovician Duster

The deep test of the Wilcox Oil & Gas Co. in Kimble County was finally given up this week after drilling to a total depth of 4,857 feet. Elevation is 2,207 feet. This test created considerable comment a few weeks ago when it logged a good oil showing in the Ellenburger member of the Ordovician at 3,677-82 feet. It is in section 1, D.&P.R.R. Survey in the western part of the county.

Upton County Extension

W. C. Ray's No. 1 Cordova Union, in section 3, A. B. Survey, 5 miles southeast of McCamey and about 3 miles southeast of the nearest production in the McCamey field, is pumping around 17 bbls. of oil per day at a total depth of 2,111 feet. It will be carried 14 feet deeper and acidied if it takes same to make a better well of it. This well logged top of the lime at 1,965 feet and the first oil at 2,056-67 feet.

Scurry Wildcat

Shasta Oil Co. is working on plans to drill a wildcat test on a block held by the Magnolia Petroleum Co. west of Dermott in Scurry County, tentative location falling in section 376, Block 197. It has been the practice of larger companies to farm out some of their West Texas blocks during the last year to smaller companies and independents to get them tested before expiration of leases.

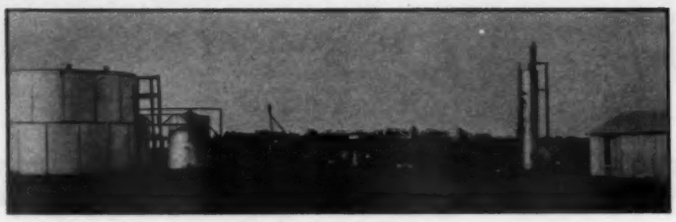
Locations

There were 21 locations staked in the district during the week, all of them field locations except one wildcat which is to be drilled in southwestern Crane County by Big Basin Petroleum Corp. of San Angelo. The test has spudded and shut down to complete rigging up in section 77, Block X, on the Jax Cowden ranch. Thirteen tests were completed, three of which were abandoned wildcats. Slack and White's No. 1 Reeves, located in section 20, Block 56, western Reeves County, was one of the dusters failing to find the Delaware saturated to the extent of making a commercial producer. Total depth of the test was 3,206 feet. It topped the lime at 2,680 feet.

Ranger and Wichita Falls

George Poulter, who last year

drilled a couple of wildcat gas wells in McCulloch County, struck gas in a wildcat test in Brown County during the week which appears to have opened another gas producing, if not oil producing, area in that county. The well, No. 1 H. H. Buse, in the R. Nixon Survey No. 99, struck shallow gas sand at 465-80 feet and is standing shut down at the latter depth waiting on cement to set after running casing. It is estimated good for a 2,000,000 foot gas wel. Elevation is 1,522 feet.



Scene in the new Lueders Pool, southeast Jones County. Discovery well with jack standing over it in middle of picture with a spudder drilling another well in the background

Shackelford Deep Test

Roeser and Pendleton will probably wait until after the first of the year to start a deep wildcat test on a 5,000-acre block 4 miles northwest of the Ibex pool in eastern Shackelford County. Merry Brothers and Perini geologized and assembled the block for the test which is expected to go to at least 4,000 feet. It is west of the Pitzer and West block on which a deep well was uncovered by those two operators this year, but which was junked because of a premature shot so damaging the casing that the hole could not be cleaned and the well completed. After the Humble Oil & Refining Co. purchased a half interest in the Pitzer and West block a second test was spudded to the south of the first hole, the second test now drilling. It will be closely watched as it nears the pay formation found in the initial well. Roeser and Pendleton's test will also be an important one for the area.

Development in the Wichita Falls district has been greatly retarded during the past couple of weeks because of heavy rains throughout the district preventing the moving in of machinery to new locations and even the completion of many of the wells. Chatham and Bohner opened a new shallow producing area about 6 miles southeast of Archer City in Archer County this week when their No. 1 J. D. Campbell came in making an estimated 100 bbls. per day from sand logged at 1,035-37 feet. It is in section 88, Clark and Plumb Survey.

Panhandle District

There were 15 locations staked in the Panhandle district this week, 9 of which were launched in Wheeler County, one of the most active counties in the district during the past year where the producing areas have been gradually extending in all directions with some excellent wells being completed. Moore County received three locations with Gray, Carson and Hutchinson each receiving one new test. There were 16 tests completed, Hutchinson County having 9 of the completions. The 16 wells came in with a total potential of 8,542 bbls. per day with a gas potential of over 49,000,000 feet.

COMPLETIONS IN WEST TEXAS

Andrews County

Stogner's No. 1 George, dry and abandoned 5,108 feet, top anhydrite 1,850, top salt 1,930 feet, top lime 4,385 feet. Elevation 3,253 feet.

Ector County

Mid-Continent Petroleum Corp.'s No. 1 Blakeney, top pay 4,110 feet, total depth 4,223 feet, initial production 550 bbls.

Pecos County

Bell Oil & Gas Co.'s No. 2 Eaton, top pay 1,635 feet, total depth 1,662 feet, initial production 15 bbls. Cardinal Oil Co.'s No. 4 Smith, top pay 330 feet, total depth 462 feet, initial production 10 bbls.

Reeves County

Slack and White's No. 1 Reeves, dry and abandoned 3,206 feet. Top lime 2,680 feet.

Upton County

Texas Pacific Coal & Oil Co.'s No. 6-B Lane, top pay 2,265 feet, total depth 2,400 feet, acidized, initial production 120 bbls. Texas Pacific Coal & Oil Co.'s No. 6-E Lane, top pay 2,229 feet, total depth 2,312 feet, initial production 415 feet.

Kimble County

Wilcox Oil & Gas Co.'s No. 1 Patterson, dry and abandoned 4,857 feet, elevation 2,207 feet.

Ward County

Simms Oil Co.'s No. 2 Mason, top pay 2,320 feet, total depth 2,570 feet, shot, initial production 368 bbls. Simes No. 1 Hayzlett, top pay 2,460 feet, total depth 3,049 feet, initial production 28 bbls.

Winkler County

Gulf Production Co.'s No. 7 Keystone, total depth 3,715 feet, plugged back to 3,672 feet, initial production 72 bbls. after shooting. Texas Pacific Coal & Oil Co.'s No. 6 Daugherty, top pay 2,720 feet, total depth 2,946 feet, shot, initial production 1,185 bbls.

Jones County

D'Arman and Sheldon's No. 1 Huffaker, dry and abandoned 2,168 feet, elevation 1,560 feet.

Situation in East Texas Becomes Routine

DALLAS, Tex., Nov. 11.—During the week the State of Texas offered for sale by public auction around 60,000 bbls. of oil in a pit now unclaimed on the Pelphrey lands in the Augustine Survey in the East Texas field. When the oil was confiscated by the State only 32,000 bbls. was named in the confiscation suit. Since that time about 28,000 bbls. more has apparently been run into the pit. The State may find it has 60,000 bbls. to get rid of, taking the entire check for its coffers after the oil is given clearance papers and sold by officials of Texas.

Overproduction in the East Texas field for the week was placed around 33,200 bbls. by men in touch with the situation. Crude runs to local refineries was a little over 65,000 bbls. per day, the connected allowable of the wells producing for the plants being 32,315 bbls. per day, which leaves over 32,700 bbls. per day to come from other sources, much of which is said to be confiscated oil. There were 25 plants operating in the field this week, all of them, however, not running every day, but intermittently.

Gasoline shipments by tank cars increased by 150 cars this week, and gasoline movement by trucks for the week was 85,940 gallons, nearly 24,000 gallons of other products being moved in this manner also. Gasoline recovery of the plants operating in the field for August showed a recovery of 46.27 per cent and 48.27 per cent for September, according to the State Comptroller's Department's figures. Total crude throughput to refineries for the latter month was given as 55,483,043 gallons with cracking stock (fuel oil and tops) at 12,458,537 gallons. This shows an increase in the yield of plants in the field, which is apparently caused by many of the smaller skimming plants being shut down and plants with cracking units operating and obtaining a greater gasoline recovery from the crude. Of the 25 plants operating during the week 15 have cracking units, some of which have a recovery of as high as 55 and 56 per cent.

Calgary Directors

WINNIPEG, Manitoba, Nov. 9.—Shareholders of the Calgary & Edmonton Corp., Ltd., at their annual meeting recently reelected the following directors: President, H. F. Osler; vice president, D. C. Coleman; directors, Patrick Burns, Viscount Chaplin, A. H. Douglas, C. Edward Disher, Charles F. Joyce, F. Gordon Osler and Frederick Roche.

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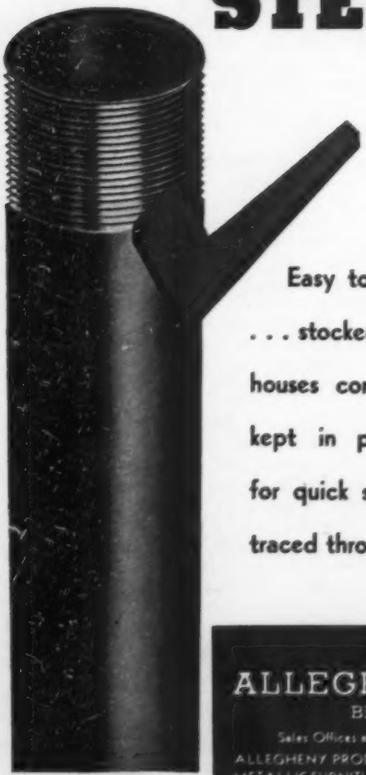

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EUNICE POOL IN LEA COUNTY LEADER IN NEW PRODUCTION

By T. R. INGRAM

DENVER, Colo., Nov. 11.—Carbon dioxide gas which congealed the oil hindered a test of the second Dakota sand in Continental Oil Co.'s No. 3 Hoye, on the South McCallum dome in Colorado. Gas is being killed to go to the next sand. Union Oil & Mining Co. will drill a deep test in the McElmo district, Montezuma County.

Ohio Oil Co.'s wildcat on the Big Hollow structure, Albany County, Wyoming, encountered water in the Tensleep and will be abandoned. Ohio Oil Co. and California Co.'s No. 2 State, on the Medicine Bow structure, made 135 bbls. an hour of 59 gravity oil in the first Sundance with 16,000,000 feet of gas and is drilling ahead to the big production in the lower Sundance.

Montana operations were slowed down by subzero weather. One well was completed in the Cut Bank field and Santa Rita Oil & Gas Co. made a location for a wildcat west of production. Continental Oil Co.'s Ingersoll test in Stillwater County was a failure and was abandoned. Most of the wells in the Kevin-Sunburst field are shut down.

One new operation is getting under way in Utah.

In New Mexico the Eunice area in Lea County led in volume of new production, with three wells with a total of 9,792 bbls. in initial production.

Rocky Mountain Runs

Production estimates for the week ended November 9, 1935, follow:

WYOMING

	Bbls.
Salt Creek	17,011
Big Muddy	1,540
Badger Basin	40
Byron	1,620
Dallas Derby	620
Dutton Creek	80
Elk Basin	shut in
Ferris	20
Frannie	120
Garland	790
Grass Creek	2,210
Greybull	10
Hamilton Dome	690
Hudson	310
LaBarge	1,410
Lance Creek	2,250
Lost Soldier	1,740
Mule Creek	340
Midway	50
Oregon Basin	4,290
Osage	650
Pilot Butte	30
Rock River	1,480
South Casper	510
Poison Spider	180
Teapot	20
Waugh Dome	350
Total	38,361

MONTANA

Buckley-Border	190
Cat Creek	810
Cut Bank	7,020
Dry Creek	110
Kevin-Sunburst	3,650
Lake Basin	50
Pondera	1,070
Total	12,900

NEW MEXICO

Artesia	590
Cooper area	8,790
Eunice area	10,060
Hobbs	28,420
Hogback	200
Hospah	shut in
Jal	3,830
Lea	1,260
Maljamar	1,750
Monument	880
Rattlesnake	830
Table Mesa	90

COLORADO

Florence	210
Fort Collins and Wellington	370
Iles dome	2,580
Moffat	600
Orchard	70
Rangely	90
Tow Creek	180
Total	4,100
Total	56,700
Total Rocky Mountain region	112,061

Hobbs Pool Potentials

Proration authorities rated the potential production of the Hobbs pool on November 1 at 2,183,557 bbls. The following table shows the potential and daily allowable production by company and illustrates how tightly the Hobbs pool is restricted in output notwithstanding the probable inability of the pool to produce the volume of oil with which it is credited.

Company—	No. of wells	Daily potential bbls.	Daily allowable bbls.
Amerada	16	168,215	2,138
Atlantic	2	15,401	219
Continental	18	178,652	2,273
Empire	8	99,273	1,200
Getty	4	54,716	644
Gypsy	21	243,725	2,973
Humble	15	141,989	1,819
Landreth	3	22,786	328
Magnolia	1	1,605	62
Mid-Continent	1	1,500	61
Ohio	10	97,856	1,209
Oil Well Drlg.	1	7,064	104
Repollo	7	47,289	675
Samedan	12	145,996	1,767
Shell	36	315,238	4,117
Skelly	6	48,498	669
Stanolind	52	331,512	4,942
California	6	43,443	540
Texas	8	89,121	1,101
Texas Pacific	4	40,643	514
Tide Water	9	56,079	727
Twin State	4	32,955	462
Walker	4	.....	49
Total	248	2,183,557	28,593

NEW MEXICO

Eunice Area

In the Eunice area in Lea County, Empire Gas & Fuel Co.'s No. 2 State C, C SW SW section 16-21-36, had pay at 3,822-50 feet from which it produced 255 bbls. of oil the first hour and 6,120 bbls. the first 24 hours, with 3,500,000 feet of gas, which came up between the drill pipe and casing. It was completed.

Skelly Oil Co. completed No. 4 State B, C NW NE section 16-21-36. It flowed 2,640 bbls. the first 24 hours from pay at 3,810-3,900 feet, total depth.

Atlantic Oil Producing Co.'s No. 1 State J, C SE NE section 29-21-36, started at 1,032 bbls. per day at 3,916-40 feet, with 2,000,000 feet of gas per day.

Empire Gas & Fuel Co. made location for No. 3 State C, C NE SW section 16-21-36. Skelly Oil Co. was moving in rotary to start No. 5 State B, C SW NE section 16-21-36. Humble Oil & Refining Co. was building rig for No. 7 State B, C SW SE section 29-21-36.

Gypsy Oil Co.'s No. 6 Bail-Ramsey-State, C NW SW sec. 4-21-36.
Drlg. 1,341 ft.

Empire Gas & Fuel Co.'s No. 2 State C, C SW SW sec. 16-21-36.

Sun Oil Co.'s No. 1 Adkins, 1,786 ft. from S and 466 ft. from W lines sec. 3-21-36.
Drlg. 3,750 ft.

Atlantic Oil Producing Co.'s No. 2 State E, C NW SW sec. 5-21-36.
T.D. 3,300 ft., 300 ft. oil and 3,100 ft. of drilling fluid in hole after drill stem test.

Gypsy Oil Co.'s No. 1 North-Bell-State, C SE SE sec. 6-21-36.
Drlg. 2,870 ft.

Humble Oil & Ref. Co.'s No. 1 Adkins, C SW SW sec. 10-21-36.
Drlg. 3,220 ft.

General Crude Oil Co.'s No. 1 State, C NW SW sec. 32-21-36.
Drlg. 3,465 ft.

Gypsy Oil Co.'s No. 2 Janda, C NE SE sec. 20-21-36.
Drlg. 2,885 ft.

Gypsy Oil Co.'s No. 1 Arnott-Ramsey, C SW SW sec. 21-21-36.
Drlg. 3,448 ft.

Atlantic Oil Prod. Co.'s No. 1 State J, C SE NE sec. 29-21-36.
Completed.

Penrose & Rowan's No. 1 Carry, C NW SW sec. 22-22-37.
Drlg. 855 ft.

Devonian Oil Co.'s No. 1 State-Heasley, C SE SW sec. 5-21-36.
Drlg. 1,140 ft.

Continental Oil Co.'s No. 4-B-8 Meyer, C NW NW sec. 8-21-36.
Drlg. 1,220 ft.

Getty Oil Co.'s No. 1 State B, C NE NE sec. 16-21-36.
Rig.

Skelly Oil Co.'s No. 4 State B, C NW NE sec. 16-21-36.
Waiting for potential test, completed.

Continental Oil Co.'s 5-A-17 Meyer, C SE SW sec. 17-21-36.
Drlg. 325 ft.

Continental Oil Co.'s No. 2-B-17 Meyer, C SE SE sec. 17-21-36.
Drlg. 1,535 ft.

Continental Oil Co.'s No. 6-C-20 State, C NE NW sec. 20-21-36.
Set 7⅝-in. casing at 1,656 ft.

Shell Oil Corp. and Devonian Oil Co.'s No. 3 State, C NE NE sec. 20-21-36.
Drlg. 1,675 ft.

Continental Oil Co.'s No. 3-A-30 Lockhart, C NE NW NE sec. 30-21-36.
Drlg. 1,330 ft.

Texas Co.'s No. 1 J. M. Dean, C SE SW sec. 28-22-36.
Rigging up rotary.

Monument Area

No completions were recorded in the Monument area in Lea County, but two wells were in the near-completion class.

Superior Oil Co. had cellar and pits dug for No. 3 State, C SE NE section 2-20-36.

Republic Prod. Co.'s No. 1 Selby & Maveety C SE SW sec. 36-19-36.
Drlg. 3,875 ft.

Sun Oil Co.'s No. 3 Weir, C SE NE sec. 35-19-36.
T.D. 3,945 ft.; acidized; flowed 10 bbls. oil per hour.

Texas Co.'s No. 1 State-E, C SW SW sec. 1-20-36.
Drlg. 2,860 ft.

Gypsy Oil Co.'s No. 1 South Graham-State, C SE SE sec. 2-20-36.
Drlg. 3,535 ft.

Superior Oil Co.'s No. 2 State, C NW NE sec. 2-20-36.
T.D. 3,935 ft.; acidized; flowed 45 bbls. per hour through tubing and 7,000,000 ft. gas per day.

Skelly Oil Co.'s No. 1 State-Monument, C SE SE sec. 13-19-36.
Drlg. 2,550 ft.

The Texas Co.'s No. 1 State F, C NE SE sec. 24-19-36.
Drlg. 2,675 ft.

Hobbs Area

No completions were reported in the Hobbs pool in Lea County in the past week, but two wells tested oil, Jeffers Oil Corp.'s No. 1 Britt permit in section 7-20-37 and Stanolind Oil & Gas Co.'s No. 7-X Capps, in section 3-19-38.

Barnsdall Oil Co. was moving in material for No. 2 Cooper, C SW NW section 7-20-37.

Gypsy Oil Co.'s No. 1 Steve Taylor, C SE NE sec. 24-18-38 (wildcat).
Drlg. 4,484 ft.

National Securities Oil Co.'s No. 1 Linam, NE SE SW sec. 33-18-37.
T.D. 4,506 ft.; P.B. to 4,238 ft.; 1,000 ft. oil, 300 ft. water in hole, shut down for orders.

Tide Water Oil Co.'s No. 1 State, 2,310 ft. from N, 330 ft. from E lines, sec. 14-18-37.
T.D. 4,368 ft.; swabbed sulfur water after acidizing. Plugged back to 3,860 ft. to test sand.

Stanolind Oil & Gas Co.'s No. 7-X Capps, 2,310 ft. from E line and 660 ft. from N lines, sec. 3-19-38.
T.D. 4,207 ft. Flowed 42 bbls. per hour through tubing. Will acidize.

Gypsy Oil Co.'s No. 2 Culp, C SW SW sec. 19-19-37.
Drlg. 3,925 ft.

Shell Pet. Corp.'s No. 3 Rice, 1,650 ft. from S and 990 ft. from E lines of SE ¼ sec. 13-18-37.
Set 7-in. casing at 3,960 ft.

Jeffers Oil Corp.'s No. 1 Britt permit, 1,980 ft. from N and W lines, sec. 7-20-37.
T.D. 3,881 ft.; flowed 200 bbls. in one hour through drill pipe. Will tube.

Shell Pet. Corp.'s No. 1 State E, C W half SE SE sec. 14-18-37.
Drlg. 235 ft.

Gypsy Oil Co.'s No. 3 North Grimes, SE NW SW sec. 21-18-38.
Drlg. 2,935 ft.

The Texas Co.'s No. 1 Mattern, C NW SW sec. 20-19-37.
Rig and tools.

Phillips Pet. Co.'s No. 1 Land Office, C NE SW sec. 19-19-37.
Getting ready to spud.

Cooper Area

Two wells were completed in the Cooper area, Lea County, Stanolind Oil & Gas Co.'s No. 1 Meyer B, C NW NE section 26-24-36, flowed 1,680 bbls. of oil and about 40 bbls. of water from pay at 3,426-98 feet. It had been drilled to 3,530 feet, but was plugged back to 3,498 feet.

Barnsdall Oil Co.'s No. 1 Alaska Cooper, C NE NE section 12-20-36, had pay at 3,877-90 feet, total depth, and flowed 410 bbls. in four hours through 1-inch choke on tubing, and was estimated as a 2,400-bbl. well through tubing.

Humble Oil & Ref. Co.'s No. 3 Mosely, C NE SE sec. 10-24-36.
T.D. 3,600 ft.; salt water; plugged back to 3,555 ft.

Humble Oil & Ref. Co.'s No. 1 Harrison, C SW SW sec. 25-24-36.
T.D. 3,572 ft.; salt water; plugged back to 3,430 ft.; flowed 86 bbls. of fluid in 24 hours, 60 per cent salt water and sediment.

Tide Water Oil Co.'s No. 1 Coats, C SW NE sec. 10-24s-36e.
T.D. 3,656 ft.; waiting for perforating gun.

Phillips Pet. Co.'s No. 1 Woolworth, C NE NW sec. 33-24-37 (wildcat).
T.D. 4,200 ft.; tested no oil or gas; plugged back to 3,540 ft.

Skelly Oil Co.'s No. 1 Harrison, C NW SW sec. 5-23-37.
T.D. 2,722 ft.; set 7⅝-in. casing 3,540 ft.

Gypsy Oil Co.'s No. 1 Lemunion, C NE NE sec. 25-23-37.
Shut down at 539 ft.
Gypsy Oil Co.'s No. 2 Cooper, C NW SE sec. 14-24-36.
T.D. 3,410 ft.; standardizing.
Gypsy Oil Co.'s No. 2 Cooper, C NW SE sec. 23-24-36.
T.D. 3,572 ft.; testing.
Skelly Oil Co.'s No. 4 Coates, C SE SE sec. 3-24-36.
Drlg. 3,190 ft.
Stanolind Oil & Gas Co.'s No. 2 Meyer B, C NW NW sec. 11-24-36.
Drlg. 3,080 ft.

Jal Area

Harry Leonard's No. 1-B Justice, SW NW NW sec. 20-25-37.
T.D. 3,501 ft.; plugged back to 2,970 ft. for gas well.
Stanolind Oil & Gas Co.'s No. 8-A Farnsworth, C NW NW sec. 18-26-37.
Drlg. 3,114 ft.
Phillips Pet. Co.'s No. 1 Woolworth, C SE SW sec. 8-25-37.
T.D. 3,441 ft.; estimated 1,500,000 ft. of gas and showing of oil through tubing.

Maljamar Area

Maljamar Oil & Gas Co.'s No. 5 Baish, C SW NE sec. 21-17-32.
Drlg. 834 ft.

Eddy County

R. D. Compton completed No. 6 Mann, NW cor. SW NE section 4-18-27, Eddy County, was abandoned at 1,420 feet. The hole filled with water at 1,417-20 feet.

Flynn, Welch & Yates' No. 70 State, C SW NW section 27-18-28, is a 15-bbl. pumper completed in sand at 2,740-2,812 feet, which had been shot with 80 quarts.

Tignor, Etz & Keys made a location for No. 3-A Keys, 660 feet from north and 1,960 feet from east lines of NW ¼ section 10-17-28. R. D. Compton made location for No. 7 Brainard, SW cor. SE SE section 5-18-27.

Fred Brainerd's No. 1 Featherstone, CEL SW SW sec. 35-16s-28e.
Drlg. 1,383 ft.
Dooley & Shank's No. 1 McClay, C NE SE sec. 33-18s-30e.
2,009 ft. sulfur water in hole at 3,556 ft.; S.D.
Dooley et al's No. 1 Commerce Trust, NW NE SW sec. 8-20s-27e.
T.D. 1,065 ft., in sand; shut down.
Etz Bros.' No. 1 State, C SE SW sec. 16-17s-30e.
Drlg. 2,786 ft.; showings of oil and gas at 27,20 and 2,780-83 ft.; completed.
Getty Oil Co.'s No. 7 Dooley, SW SW NW sec. 24-20s-29e.
Drlg. 6,666 ft.
Red Lake Oil Co.'s No. 5 State, NW NW NE sec. 27-17s-28e.
Drlg. 850 ft.

Sandoval County

Continental Oil Co.'s No. 1 L-Ranch, 2,010 ft. from N and 330 ft. from E lines, sec. 2-13-14w.
Drlg. 5,237 ft.

Chaves County

Comanche Drlg. Co.'s No. 2 Sloop-Purcell C NE NE sec. 15-11s-26.
Location.
Warman Oil Trust's No. 1 Weldon & Hoar, NW NW SE sec. 9-14-25.
T.D. 1,683 ft. in sand; P.B. to 1,395 ft.; S.D.

Lea County

Vierson & Brown's No. 1 Robbins, C NW SE sec. 14-11-32.
Drlg. 2,540 ft.

NORTHWEST NEW MEXICO

Bernalillo County

Norine Realty Co., Inc.'s No. 1 Gallegas grant, SE SW SW Sec. 19-11n-4e.
S.D. 630 ft.

McKinley County

Co-operative Prod. & Ref. Co.'s No. 1 fee, SW cor. Sec. 21-20n-9w.
Drlg. 540 ft.; shale.
Lark Drlg. Co.'s No. 2 Santa Fe, NE NW NE Sec. 29-20n-9w.
Drlg. below 200 ft.
Montrose Oil & Gas Co.'s No. 1 State, NE NE Sec. 28-20n-9w.
Drlg. 400 ft.
S. Dysart et al's No. 1 Bouton, E NW NE Sec. 14-4n-10w.
O.W.D.D.; resumed at 1,365 ft.

Rio Arriba County

El Vado Structure Properties Co., Ltd.'s No. 1-A Tierra Amarilla grant, NE Sec. 26-3s-1e (unsurveyed).

Quay County

Danube Drlg. Co.'s No. 1 Will Wallace, NE NE SE Sec. 12-9n-32e.
T.D. 1,000 ft.; prep. to run 8¼-in.

Quay County Dev. Co.'s No. 1 Wallace, SW SW SE Sec. 19-9n-33e.
T.D. 816 ft.; rainbows at 814 ft.; show of salt water at 775 ft.

Sandoval County

Continental Oil Co.'s No. 1 L-Bar Cattle Co., CEL SE NE Sec. 2-13n-4w.
Drlg. 5,230 ft. in light gray shale.

San Juan County

Aztec Coop. Oil Co.'s No. 1 Greer, SE SE SW Sec. 10-30n-11w.
S.D. 332 ft. in shale.
J. F. Cross et al's No. 1 Wilson, SW SW SE Sec. 17-30-11w.
S.D. 810 ft.
Cross & Poole's No. 1 Aztec, Sec. 1-30-11w.
Making water shutoff at 740 ft.
Kutz Canon O. & G. Co.'s No. 1 Day, SW SW SW Sec. 20-28-10.
T.D. 4,400 ft.; fishing for tools.
R. C. Oswell's No. 4 Government, SW SW NE Sec. 24-30-11w.
S.D. 1,790 ft.
R. C. Oswell's No. 6 Government, SE NE Sec. 33-30-11w.
Spudded and S.D.
Phillips & Spence's No. 2 Martin, NW NE SW Sec. 34-30n-11w.
Comp. for 238,000 ft. gas in sands at 937-49 ft. and 1,013-19 ft.
Reserve Oil Co.'s No. 6 Shaffer, SE NE SE Sec. 36-22n-14w.
Location.
San Juan Pet. Co.'s No. 1 Lemley, NE SE SE Sec. 22-30-11w.
S.D. 1,314 ft.
Southern Union Gas Co.'s No. 1 Government, C NW NE Sec. 14-28n-11w.
Moving in materail (first report).
Nick Suatter's No. 1 fee, C NE SW Sec. 32-31-11w.
S.D. 1,745 ft. for pipe.
W. R. Webb's No. 2 fee, C NE NW Sec. 6-30n-11w.
Location (first report).
W. R. Webb's No. 1 fee, CEL NE NW Sec. 6-30-11w.
P.B. from 1,500 ft. to 1,350 ft.; testing.

San Miguel County

Cabra Springs O. & G. Co.'s No. 1 Thompson, SW NE NE Sec. 22-12n-22e.
S.D. 4,067 ft.
Cabra Springs O. & G. Co.'s No. 2 West Pino Mesa, SW SW NW Sec. 31-12-22.
S.D. 726 ft.
Pioneer Oil Co.'s No. 2 Montezuma, CSL SE SW Sec. 14-15n-16.
Drlg. 300 ft.
Starr-Kennedy Oil Co.'s No. 3 Abrams, NE NE SE Sec. 25-17-16.
Standing at 5,050 ft. after completing rig; to resume following fire.
Holmberg Interest's No. 1 Cantwell, NW NW SW Sec. 5-10n-9e.
S.D. 810 ft. (corrected).
Kelsey Clients Dec. Est.'s No. 2 State, C N WSec. 22-10n-10e.
S.D. 1,450 ft.

Torrance County

48 Pet. Co.'s No. 1 Greenfield, C NW SW Sec. 17-9-8e.
Drlg. 1,000 ft.
Bruce Fraier's No. 1 Graier, SE Sec. 12-2n-7e.
Drlg. 1,210 ft. in granite wash water at 882-86 ft.
Quaker States Oil Co.'s No. 1 Zurich, NW SE SW Sec. 2-21n-24e.
Spudding 110 ft. (first report).

Union County

Sierra Grande Oil Corp.'s No. 2 Rogers, C NE NW Sec. 4-29-20.
T.D. 2,715 ft. in granite.
Ringle Dev. Co.'s No. 2 Tome grant, C NE SE Sec. 20-6n-3e.
Rigged and S.D.
Ringle Dev. Co.'s No. 1 Tome grant, C SE SE Sec. 26-6n-3e.
S.D. 400 ft.
Western Natural Resources Corp., Inc.'s No. 2 San Clementer, SE SE NW Sec. 5-6n-1e.
T.D. 6,001 ft.
Pres-Sel Dev. Co.'s No. 1 Toltee, NE SW SW Sec. 30-12n-10w.
S.D. 270 ft.

COLORADO

Adams County

Riddle Pet. Co.'s No. 1 Baxter, C SW Sec. 2-3s-6w.
Drlg. below 100 ft.

Archuleta County

William E. Hughes Est.'s No. 3 fee (unsurveyed), approx. SE cor. NW Sec. 24-32n-2e, 40 ft. N and 440 ft. W of No. 2.
Drlg. 855 ft.; show of oil at 844 ft.
William E. Hughes Est.'s No. 2 fee (unsurveyed); approx. SW Sec. 24-32n-2e.
Shut in at 1,120 ft. for pumping unit.
Oil City Pet. Co.'s No. 1-A Garnett, NW NE NW Sec. 25-33n-2e.
Navajo Oil Co.'s No. 1 Crowley, SW SW NE Sec. 11-32-1e.
T.D. 1,138 ft.; artesian water at 1,129-38 ft.; will S.O. with 5 2/16-in.

Baca County

J. H. Everett et al's No. 1, 330 ft. NW cor. Sec. 24-32-48.
Spudded water well.

Boulder County

Leslie R. Steele et al's No. 1 Maxwell, SW NE NW Sec. 24-1n-71.
Drlg. 220 ft., black shale; show of gas.

Elbert County

Ramsey Pet. Corp.'s No. 1, 200 ft. W of C Sec. 13-8s-57w.
Rig up.

Fremont County

Waterville Oil Co.'s No. 1 State, SE SE NW Sec. 16-18s-69w.
Landed 5 3/16-in. at 2,780 ft.; shut off show of oil and salt water and S.D. at S.D. 2,997 ft.

Grand County

Interstate O. & G. Co.'s No. 1 Hinman, NE NE NW Sec. 11-2n-81.
S.D. 2,997 ft.

Huerfano County

S. W. Pressey's No. 1 Ojo, SW NE Sec. 10-28-69.
Collins & Quinn's No. 1, C W½ E½ Sec. 4-28s-68w.
S.D. 3,810 ft. for fshg. tools.

Jackson County

Continental Oil Co.'s No. 3 Hoye, on the South McCallum dome, stopped at 5,115 feet to test sand in the second Dakota at 5,079-5,100 feet which showed saturation in the cores. On account of the presence of carbon dioxide gas, which congealed the oil, considerable difficulty was encountered. The test showed some oil and about 3,500,000 feet of gas. The well is being killed to go to the Lakota. The first Dakota showed good saturation when cored, but this was cased off with the 9⅝-inch without testing. It will be tested later.

Colorado Oil Ref. Co.'s No. 1 North Park Coal, NW NW Sec. 18-9n-78.
T.D. 1,805 ft.; fshg. for baller.
Continental Oil Co.'s No. 3 Hoyle, NW NW NE Sec. 34-9n-78.
T.D. 5,115 ft.; killing gas to drill to the Lakota.

Jefferson County

Ruby Hill O. & G. Co.'s No. 1 Braden, SE cor. Sec. 24-4n-69.
S.D. 4,280 ft.

La Plata County

McGarr Pet. Co.'s No. 1 Pinon Mesa, CSL NE NE Sec. 34-33n-12w.
S.D. 405 ft. (cor.).

Las Animas County

Mountain State Oil Corp.'s No. 1 Nickols, C NE NE SE Sec. 10-34-62.
S.D. 1,640 ft.

Lincoln County

Consolidated Smelting & Metals Co.'s No. 1 Hancock, NE NE Sec. 7-17s-52.
S.D. 1,830 ft.; derrick pulled in.

Moffat County

Stanolind O. & G. Co.'s No. 16-X Parkinson, 220 ft. W and 618 ft. of NE cor. Lot 5 (SW NW NW), Sec. 23-4n-92w.
Drlg. 3,249 ft.

Montezuma County

E. J. Holland, field manager of Union Oil & Mining Co., is at Cortez to superintend moving in of standard rig and equipment for a deep test on the Ackerman, or Sylvan structure north of the McElmo test and near the Sylvan schoolhouse. Mr. Blakesley, the company's geologist, has been mapping the structure for two months. Location has not yet been released.

McElmo Oil Co.'s No. 1 West, NE NW NE Sec. 21-26n-17w.
T.D. 2,705 ft.; fishing for tools.

Morgan County

Swisher et al's No. 1 Lunt, 92 ft. W of E line and 360 ft. N of S line, Sec. 3-4n-60.
Drlg. 1,230 ft. in very hard and tight sand and grit; small show of oil.

Park County

South Park Co.'s No. 1 State, SE SE SW Sec. 16-11s-75w.
U.R. 6⅝-in. from 3,606 ft. to 3,658 ft.

Prowers County

Trojan O. & G. Co.'s No. 1 Lotus Oil, NW NE NE Sec. 15-23-4n.
Reported running 4½-in. at around 5,800 ft.

Routt County

Mid-Colo. Pet. Co.'s No. 1 Omhalt, NE NE SE Sec. 29-4n-87w.
Drlg. 2,820 ft. near base Lakota in hard sand showing some oil; no water.

Washington County

Fremont Buttes Oil Co.'s No. 1 Gilcrest, SW SE SW Sec. 22-3n-53w.
S.D. 200 ft.; 16½-in. at 137 ft.

WYOMING

Albany County

Ohio Oil Co.'s No. 1 Emery, a test of the Big Hollow structure, encountered water in the Tensleep at 2,445 feet. It will drill a few feet deeper before plugging to abandon. No Dakota or Sundance were encountered.

California Co.'s No. 2 Hoist, SW NE SE Sec. 13-17n-77.
S.D. 4,085 ft. to repair boilers.
California Co.'s No. 1 Wilson, NW SW SW Sec. 18-17n-76.
S.D. 1,010 ft. (cor.) for wtr.
Ohio Oil Co.'s No. 1 Emery, C SE NE Sec. 30-15n-75w.
Water in Tensleep at 2,445 ft.

Big Horn County

J. W. Bales' No. 1 Parker, C SW SW Sec. 23-49-89.
Drlg. 600 ft.; carrying 5 3/16-in.
Peter Evanoff et al's No. 1 McAllister, Lot 40, NW NE SE Sec. 3-55n-97w.
Drlg. 2,950 ft.
Joan Oil Co.'s No. 1 Howell, NW SE NE Lot 63, Sec. 32-55n-97.
S.D. 1,400 ft.
Kinney-Coastal Oil Co.'s No. 3 Government, SW NW NE Sec. 24-56n-98w.
T.D. 4,234 ft.; set whipstock at 4,050 ft.
W. S. Gilbert's No. 1 Zaring, SE SE SE Sec. 35-52n-93w.
Drlg. 1,000 ft.
Ohio Oil Co.'s No. 4 Byron Union, W SW NE Sec. 22-56-97.
Drlg. 831 ft.
Ohio Oil Co.'s No. 3 Sessions, NW SW NW Sec. 35-56n-97w.
Coring at 4,101 ft. in Madison lime; top of saturation at 3,947 ft.
Ohio Oil Co.'s No. 1 Lindsay, SW SW NE Sec. 23-56n-97w.
Digging cellar (first report).
Montana-Wyoming Oil Co.'s No. 1 Allen, 210 ft. from N line, 936 ft. from E line, Lot 52 (NW SE NE), Sec. 32-56n-97w.
T.D. 3,170 ft.; reblt. derrick; fshg.
Peay Oil Co.'s No. 2 Government, SE SE SE Sec. 10-55n-97w.4
Rig (cor.); S.D. indef.
Peay Oil Co.'s No. 1 Denio, Tract 43-C, Sec. 15-55n-97w.
O.W.D.D. from 3,225 ft.; reset 8¼-in. at 3,260 ft.; drlg. at 3,325 ft.
J. H. Shaffer's No. 1 Keachie, C SW SW Sec. 7-49-91.
T.D. 1,350 ft.; U.R. 6⅝-in.
Wyoming O. & R. Co.'s No. 1 Evans, NE NE SW Sec. 12-49-91.
Set 1½-in. at 85 ft. (cor.) and S.D.

Carbon County

Ohio Oil Co. apparently has its second big high-gravity oil well on the Medicine Bow structure in No. 2 State, a joint operation with California Co. It stopped for a drill-stem test of the upper Sundance at 5,474-5,505 feet and in a two-hour test flowed at the rate of 135 bbls. an hour with 16,000,000 feet of gas a day. It then cored through the first Sundance at 5,532 feet and is continuing to the lower horizon in which the big pay was found in No. 1 Kyle, NE SE NE section 26-21-79, last summer. The oil tested 59 gravity. It is approximately a mile southeast of No. 1 Kyle, discovery well, and 385 feet down structure. The corrected elevation is 7,204 feet. The initial production was 6,360 bbls. first 24 hours with 81,000,000 feet of gas, at a total depth of 5,393 feet, the upper sand showing heavy gas with 500 to 1,000 bbls. of distillate.

Ohio Oil Co. and California Co.'s No. 2 State, C NW NW Sec. 36-21n-79w.
Coring below 5,532 ft.
Ohio Oil Co.'s No. 5 Diamond Cattle, NW SW NW Sec. 35-20-78.
Cmtd. 5 3/16-in. liner at 2,633-3,132 ft. in upper Sundance.
Ohio Oil Co. and California Co.'s No. 1 Union Pacific, Acct. J, NE SW NW Sec. 25-21-79w.
Drlg. 3,842 ft.
General Pet. Corp.'s No. 1 Whitford, SW SE SE Sec. 24-20-84.
T.D. 5,500 ft.; running 8⅝-in. to condition hole.
General Pet. Corp.'s No. 1 Union Pacific, C SW SW Sec. 19-20-83.
S.D. 5,931 ft.; may be deepened.
Sinclair-Wyoming Oil Co.'s No. 9 Wertz, NE NW NW Sec. 7-26n-89w.
Drlg. 2,332 ft.
Shirley-Wyoming Oil Co.'s No. 1 Government, NW NE Sec. 2-26n-80w.
Drlg. 821 ft.
Union Oil Co. of Calif. and Mutual Oil Synd.'s No. 1 Union Pacific, SE SW SE Sec. 1-18-78w.
Drlg. 561 ft.

Converse County

Chadron-Osage Oil Co.'s No. 1 State, SW cor. Sec. 16-32-69.
S.D. 1,400 ft.
Continental Oil Co.'s No. 60 State, NW SW NE Sec. 9-33-76.
Drlg. 5,200 ft. in red beds; 9⅝-in. at 4,462 ft.
Otto Olson et al's No. 1 Carey, Sec. 6-32-71.
S.D. 642 ft.
John Ackard's No. 1 Daniels, SW SW SE Sec. 17-32-71.
Drlg. 3,000 ft.

Fremont County

Mid-American Oil Co.'s No. 3 Government, NW NE SW Sec. 25-28-92.
Drlg. 1,570 ft.
Nelson & Poupiert's No. 3 Enos, Lot 7, Sec. 27-3n-1w.
Drlg. 1,100 ft.; showing for 1 bbl. of oil.

Hot Springs County

California Exploration Co.'s No. 2 Government, NW SW NW Sec. 7-44-96.
Coring at 4,151 ft. for Tensleep; saturated lime at 3,898-3,954 and 4,040-46 and saturated sand at 4,113-77 ft.
Ohio Oil Co.'s No. 72 Millsiron Cattle Co., NE SE SE Sec. 19-46n-98w.
Drlg. 2,982 ft.
Stanolind O. & G. Co.'s No. 20 State-Ridgely, SE SE SE Sec. 19-46n-98w.
S.D.; derrick.

Lincoln County

Senrab Oil Co.'s No. 3 Government, N SE NW Sec. 10-26-113.
Drlg. 1,020 ft. (cor.).
Superior-Wyoming Oil Co.'s No. 2-B, Lot 3 (NW NW), Sec. 3-26-113w.
S.D. 890 ft.

Niobrara County

Black Hills Ref. Co.'s No. 1 Wyrick, C SW NE Sec. 28-36n-64w.
Derrick; W.O. rotary (first report).
Black Hills Ref. Co.'s No. 1 Mills Est., C SE NW Sec. 27-36n-64w.
Location (first report).
Continental Oil Co.'s No. 3 Joss, 200 ft. E of C NW NE Sec. 6-35n-65w.
T.D. 3,937 ft.; W.O.C.; 7-in. at 3,840 ft.
J. H. Huber Co.'s No. 1 Joss, NE SE NW Sec. 6-35n-65w.
T.D. 4,096 ft.; fshg. for tubing, swab and fishing tools; H.F.W.; will plug off bottom water and produce sand at 4,003-42 ft. if hole can be saved.
Interstate O. & R. Co.'s No. 1 Morrell, NW NE SE Sec. 9-19-51.
T.D. 3,030 ft.; P.B. to 2,835 ft.; S.D.
Fall River Royalty & Producers Co.'s No. 5-L Briggs, CSL NE NE Sec. 2-39n-61w.
Drlg. 385 ft.
Ohio Oil Co.'s No. 5 Converse Sheep, C SE SW Sec. 32-36-65w.
Rig up.
Ohio Oil Co.'s No. 7 Lamb, C NW NE Sec. 5-35n-65w.
Drlg. 2,514 ft. in shales and dry sand.
S. & H. Dev. Co.'s No. 1-A Olinger, SE NE NW Sec. 1-36-63.
S.D. 1,680 ft.
Riggs Drlg. Co.'s No. 2 Spaugh Land & Livestock, SW SW SW Sec. 32-34n-65w.
M.I. rig (first report).

Park County

Continental Oil Co.'s No. 4 Northern Pacific, NW NE SE Sec. 23-58n-98w.
Location.
Geo. T. Beck's No. 1 fee, NW SE NW Sec. 27-33-101.
Drlg. 1,640 ft.
Garland Oil Co.'s No. 2 Government, SE NE NW Sec. 14-56-98.
S.D. 2,160 ft.
Resolute Oil Co.'s No. 1 State, C SW SW Sec. 16-57-101.
S.D. 3,608 ft.

Sheridan County

Beaver Creek Oil Synd.'s No. 1 Allison, SW SE Sec. 15-55-85.
S.D. for the winter at 2,865 ft.

Sublette County

Texas Co.'s No. 3-C, SE SE NW Sec. 34-27n-11w.
T.D. 914 ft.; sands at 890-912 and 790-802 ft.; H.F. fluid; not tested.
Pines-LaBarge Oil Co.'s No. 2 Government, CEL NE NW Sec. 18-27-113.
Drlg. below 520 ft.

Sweetwater County

Sinclair-Wyoming Oil Co.'s No. 12-A, SE SW NW section 11-26-90, Lost Soldier field, was deepened from 449 to 555 feet and recompleted as a small pumper. Its No. 17-A, SE NW SW section 11-26-90, was plugged back from 825 feet to 555 feet and completed for 1 bbl. per day.

Mountain Fuel Supply Co.'s No. 1 Brooks, C NW NE Sec. 15-16n-104w.
Drlg. 530 ft.
Vermillion Oil Co.'s No. 1 Government, SW SW SW Sec. 7-12n-99w.
Mat. on ground; S.D. until spring.
Sinclair-Wyoming Oil Co.'s No. 6 U.S.P., SW SW NW Sec. 11-26n-90w.
S.D. 2,330 ft.

Uinta County

Druscilla Connell et al's No. 5 Government, SW NW NW Sec. 24-15n-118w.
Drlg. 1,036 ft.
Intermountain Pet. Corp. of Utah's No. 1 Union Pacific-Hayes, SW NW SW Sec. 24-19n-118w.
Drlg. 1,550 ft.
W. D. Marshall's No. 1 Government, NW SW SE Sec. 12-15n-118w.
Drlg. 750 ft.; 8¼-in. at 425 ft.
Ragan Pet. Co.'s No. 4, NW SW NW Sec. 13-15n-118w.
Deepening from 853 ft.

Washakie County

Ariton & Doyle's No. 1 Government, SW SW SE Sec. 29-48-91w.
Drlg. 850 ft.
Christenson & Thorne's No. 2 Govt., NW SW SW Sec. 31-48-90.
Drlg. 100 ft.; 10-in. at 85 ft. (first report).
Wyoming O. & R. Co.'s No. 1 Frison, NW SW NW Sec. 14-48-91.
S.D. 1,710 ft.

Weston County

Conway Oil Corp.'s No. 1 Government, C SE NW Sec. 7-41-60.
Drlg. 2,235 ft.
Des Moines-Osage Synd.'s No. 11, CNL NE NE Sec. 25-46n-64w.
Drlg. 700 ft.
Federal Oil Co.'s No. 3 Government, C NE SE Sec. 15-46-64w.
Running 8¼-in. at 1,200 ft.
Beaver Creek Oil Synd.'s No. 1 State, C NE NE Sec. 23-44-62.
Spudded and S.D.
Glenn Taylor's No. 1 Bock, C SW NE Sec. 3-45n-63w.
Running 8¼-in. at 300 ft.
L. C. Packman's No. 1, NW N WNW Sec. 19-46n-63w.
Resumed at 450 ft.; R.U. to run 8¼-in. to bottom.
Grytler Holm's No. 1 Apostal, NW SE SW Sec. 4-46n-63w.
S.D. 140 ft.
Osage Trust Co.'s No. 4, SE SW SE Sec. 8-46n-63w.
Spudding 66 ft. (first report).
Henry Egert's No. 2, SW NE SE Sec. 8-46n-63w.
Rig on loc. (first report).

MONTANA

September production of Montana fields as reported by the Oil Conservation Board, was as follows:

Kevin-Sunburst and Border	117,782
Cut Bank	214,165
Cat Creek	23,830
Pondera	34,807
Others	14,930
Total	405,514

Crude consumption for September was as follows:

Refined in Montana	178,857
Used for fuel or lost	2,210
Shipped to Canada	323,729
Shipped to Wyoming	1,236
Destination unknown	11,380
Total	517,412

Oil in storage September 30 was as follows:

By producers	148,658
By transporters	550,643
By refiners	195,473
By purchasers for storage	236,880
Total	1,131,654

Receipts from Wyoming for the month were 184,782 bbls. of which 157,820 bbls. was consumed and storage at end of month was 46,949 bbls.

Big Horn County

Daniels Pet. Co.'s No. 1 May, C SE SE Sec. 13-1s-33e.
Drlg. 2,900 ft.; carrying 6¼-in.
Enterprise Oil Co. et al's No. 2 Lynde, SW SW SE Sec. 31-6n-35e.
S.D. 2,590 ft.

Carbon County

Bailey Round Butte Oil Co.'s No. 1, 1,120 ft. W of E line and 3,140 ft. N of S line, Sec. 3-6s-23.
Drlg. 1,475 ft.

Cascade County

C. Leonard Smith's No. 1, NE NE SW Sec. 14-22n-21.
S.D. 13e.

Choteau County

Mills & Decker's No. 1, NE NW Sec. 29-27n-13e.
Rig up.

Fallon County

Montana-Dakota Utilities Co.'s No. 1, NE NW Sec. 17-3n-62e.
Coring at 4,538 ft. in limey shale.
Montana-Dakota Utilities Co.'s No. 74, NE SE SW Sec. 34-10-58e.
Completed at 809-943 ft. in Judith River series for 8,000,000 ft. of gas.

Gallatin County

Montana Gas & Pet. Corp.'s No. 1 Adams, SE SE SE Sec. 36-2n-1e.
S.D. 2,400 ft.
Ben W. Ryan's No. 1 Tice, NE NE NE Sec. 28-1n-2e.
Drlg. 2,576 ft.

Fergus County

Button Butte O. & G. Co.'s No. 1 Woodward, SE SE SW Sec. 20-14n-24.
S.D. 3,095 ft.
Kalispel-Kevin Oil Co.'s No. 1 Emmons, 220 ft. W of E line and 2,140 ft. N of S line, Sec. 6-20-18.
Drlg. 2,240 ft. in basal Colorado; 6⅝-in. at 2,200 ft. (formerly Emmons, et al).
S. W. Pennock et al's No. 1 Nordheim, NW NE NE Sec. 6-21n-18e.
S.D. 480 ft. (corrected).
H. C. Rowland et al's No. 1, NE NW NW Sec. 13-17n-23e.
Drlg. 625 ft. (first report).
E. A. Fenholt's No. 1, NW NW SW Sec. 24-21n-17e.
Rigging up.
Judith Operating Co.'s No. 1 Government, C SW SW Sec. 26-22n-17e.
Drlg. 700 ft.

Glacier County

A blizzard, bringing with it subzero weather, swept over the Cut Bank field the past week and slowed down drilling operations. One well was completed in the Texas Co.'s No. 2 Long, SE cor. section 23-35-6w, at 2,856 feet. It swabbed 97 bbls. in 12 hours from the pay at 2,800-50 feet.

R. C. Tarrant's No. 5 Britton, C NW SW section 12-34-6w, reported a completion, but not tested, last week, swabbed 220 bbls. first 12 hours.

Santa Rita Oil & Gas Co.'s No. 1 Lander, a wildcat on the west side, half a mile west of the nearest producer, is the only new operation reported.

A. B. Cobb's No. 5 Walberger, C NE NE Sec. 35-35n-6w.
Rig.
Cobb-Pardee's No. 1 Morrison, 1,980 ft. S of N line and 75 ft. E of W line Sec. 24-33n-6w.
Drlg. 2,065 ft.
Consolidated Gas Co.'s No. 10 Tribal, Lot ⅛ (SW SW NE), Sec. 34-35-6w.
W.O.C. 7-in. at 2,898 ft., 50 sacks.
Consolidated Gas Co.'s No. 1 Simero, C NE SE Sec. 1-33n-6w.
Drlg. 2,110 ft.
Lon Crumley's No. 2 Jones, C NE SW Sec. 31-34n-5w.
Spud. and S.D. at 50 ft.
Fowler et al's No. 1 Tweedy, SW SE SE Sec. 35-33-6w.
S.D. 2,500 ft.
R. C. Jeffries' No. 4 Lukens, NE NE NE Sec. 12-33n-6w.
W.O. C.; 10-in. at 580 ft.
R. C. Tarrant's No. 1 Thacker Bond & Mtg., SE SW NW Sec. 27-32-5w.
S.D. 2,535 ft.
Montana Power Gas Co.'s No. 1 Connolly, NW cor. Sec. 7-33n-5w.
Drlg. 1,725 ft.
Montana Power Gas Co.'s No. 2 Peterson, 1,000 ft. E of W line and 2,640 ft. S of N line, Sec. 30-35n-5w.
Rigging.
Montana Power Gas Co.'s No. 1 Rigney, C NW NE Sec. 2-35n-6w.
Drlg. 2,175 ft.
P. M. K. Pet. Co.'s No. 2 Haglund, Sr., NW NW NE Sec. 14-35n-6w.
Drlg. 2,015 ft.
Royalite Co.'s No. 1 Hagen, NW SW Sec. 4-31n-7w.
Location (first report).
McCabe & Jeffries' No. 2 Government, SW NE SE Sec. 32-35n-5w.
Drlg. 2,550 ft.
Santa Rita O. & G. Co.'s No. 1 Lander, C N half SE Sec. 16-35n-6w.
R.U.R. (first report).
Santa Rita O. & G. Co.'s No. 1 Shearon, 660 ft. S of N line and 348 ft. W of E line, Sec. 34-36n-6w.
Mat. on loc.
Santa Rita O. & G. Co.'s No. 1 Jacbson, C NE SW Sec. 8-33n-5w.
Drlg. 2,755 ft.
Santa Rita O. & G. Co.'s No. 6 Tribal, C S half SE Sec. 16-35n-6w.
Spud. and S.D.
R. C. Tarrant's No. 4 Miller, 100 ft. N of C SE NE Sec. 24-34-6w.
S.D. 1,400 ft.
R. C. Tarrant's No. 3 Getty, NW NW SE Sec. 2-34-6w.
U.R. 6⅝-in. at 2,755 ft.
R. C. Tarrant's No. 2 Hope, NW SW SW Sec. 18-34-6w.
Spudding.
R. C. Tarrant's No. 6 Britton, C SE SW Sec. 12-34n-6w.
Rig on location (first report).
R. C. Tarrant's No. 3 Williams, C SE NE Sec. 11-34n-6w.
S.D. 1,425 ft.
R. C. Tarrant's No. 2 Jones, NW NW SW Sec. 31-34n-5w.
Rigged.
Yukon Oil Co.'s No. 1 Federal Land Bank, 440 ft. N and 666 ft. W of SE SW Sec. 11-34n-6w.
Location.

Liberty County

Western Natural Gas Co.'s No. 1 Wallace, C SW NW Sec. 15-37n-4e.
Drlg. 1,240 ft.

Park County

Ben W. Ryan et al's No. 1, NE Sec. 28-2n-11w.
Ready to spud.

Petroleum County

H. H. Schwtr's No. 7 Government, NE SW SW Sec. 11-15n-29e.
T.D. 1,450 ft.; P.B. to 1,350 ft.

Phillips County

Little Rocky Dev. Co.'s No. 1, SE SE SE Sec. 17-24-24.
S.D. to finance at 352 ft.
Phillips Dev. Co.'s No. 6 Government, NW SW Sec. 2-24n-24e.
S.D. 659 ft.; show gas at 568-604 ft.; water at 650-59 ft.

Pondera County

Dave Mills' No. 1 Erickson, SW SW SW Sec. 3-27n-4w.
Drlg. 275 ft.; considerable water at 190 ft.
Texas Co.'s No. 1 Unit 2, NE SW NW Sec. 21-30n-5w.
Rigging and drilling W.W.

Stillwater County

Continental Oil Co.'s No. 1 Parker, S SW SE section 25-5s-17, Ingersoll district, was plugged and abandoned at 3,260 feet, total depth. It had fresh water at 3,238-58 feet and plugged back to 3,010 feet to test a show. The test was on the south end of the Stillwater anticline, 6 miles southeast of the company's No. 1 Orr, abandoned several months ago. The base of the Frontier was at 2,167 feet.

Toole County

Nine drilling wells were shut down the past week in the Kevin-Sunburst field on account of the cold weather. There were no completions and only one new location.

Carscallen & Mitchener's No. 1 Greuger, C S half NE Sec. 10-34n-2w.
S.D. 1,542 ft.
Cassidy and Cassidy's No. 1 Veitch, 220 ft. W of E line, 660 ft. N of S line, Sec. 31-35-2w.
S.D. 1,630 ft.
Coolidge & Coolidge's No. 4 O'Hara, NE NE SE Sec. 35-36n-2w.
S.D. 1,030 ft.
A. E. Crumley's No. 8 Shaw, SE NW SE Sec. 35-36n-2w.
Rig (first report).
Huso Brothers' No. 3 Government, SW NE SE Sec. 14-35n-3w.
S.D. 1,000 ft.
Fred R. Munger's No. 1 Government, SW NE NW Sec. 13-35-2w.
S.D. 1,492 ft.
W. M. Hanlon's No. 2, SW NW SE Sec. 27-35n-3w.
T.D. 1,712 ft.; acidized and C.O.
Wm. McKnight's No. 3 Seabrook, SW NW SW Sec. 19-35n-2w.
S.D. 580 ft.
Nepsted - Montgomery - Farther's No. 1 Haugen, NE NW NE Sec. 11-35n-3w.
S.D. 1,000 ft.
Nepsted - Montgomery - Farther's No. 1 Grass, 660 ft. W of E line and 220 ft. N of S line, Sec. 17-35n-1w.
Rigging.
Ohio Oil Co.'s No. 8 Reeg, NW NW SW Sec. 14-35n-2w.
Rigging.
Pfaffe & Engleking's No. 10 Government, SW SW SE Sec. 19-35n-2w.
T.D. 1,511 ft.; Ellis-Madison at 1,509 ft.; dry; will acidize.
E. O. Reickhoff's No. 2 Government, SW SW NE Sec. 3-35-2w.
S.D. 1,034 ft.
Stock Brother's No. 3 Haggerty, NW SW SW Sec. 13-35n-2w.
S.D. 1,524 ft.
R. C. White's No. 1 Haugen, NE NE SE Sec. 11-35-2w.
S.D. 900 ft.
C. Leonard Smith's No. 1 Eckhoff, C SE Sec. 6-33n-2e.
S.D. 575 ft.
C. Leonard Smith's No. 1 Federal Land Bank, C NE NE Sec. 11-33n-1e.
Spudding at 175 ft.
C. Leonard Smith's No. 1 I. Halverson, C NE SE Sec. 18-33n-2e.
S.D. 730 ft.; tested 500,000 ft. of gas at 720 ft.
C. Leonard Smith's No. 1 H. Halverson, NW NE Sec. 18-33n-2e.
Drlg. 560 ft.

UTAH

Grand County

Columbia Crude Co.'s No. 1 Rath, SW SE Sec. 12-25s-20e.
S.D. 80 ft. (cor.).
Utah Southern Oil Co.'s No. 1 Hyde, SE NW NW Sec. 33-22n-22e.
Drlg. 620 ft. in sandy lime.
Norden Corp., Ltd.'s No. 1 State, NE SE SE Sec. 34-21s-16e.
Drlg. 321 ft. (first report).

Summit County

Longwell Pet. Co.'s No. 1, SE SW SE Sec. 35-3n-5e.
S.D. 1,210 ft.

Utah County

Diamond Oil Co.'s No. 4 Government, CSL SE NW Sec. 16-8s-5e.
Drlg. 3,847 ft. (cor.).

Washington County

Arrowhead Pet. Co.'s No. 2 Escalante, NW NW NE Sec. 19-42-15.
T.D. 4,114 ft.; P.B. to 3,250 ft.; shot and C.O.
Arrowhead Pet. Co.'s No. 1-A, SE SW NE Sec. 1-42-15.
Drlg. by lost tools cmtd. off at 2,070 ft.
Anna V. Toney's No. 1 Toney, CNL NE SE Sec. 33-40s-11w.
Drlg. 370 ft. (first report).
W. W. Toney's No. 1 Government, CNL SE SW Sec. 18-41s-12w.
Drlg. 185 ft. (first report).

Southwest Texas District

By
GEORGE WEBER

LOPEZ, CAESAR, LOMA NOVIA FIELDS REPORT EXTENSIONS

SAN ANTONIO, Tex., Nov. 11.—Extensions to the Lopez, Caesar and Loma Novia fields, and interesting developments in Guadalupe, Nueces, and Goliad Counties marked the highlights of the week's drilling in Southwest Texas.

Following completion of two large producers in the southwest Darst Creek or Clark field of Guadalupe County, two weeks ago, a decided increase in activity has been apparent in the Fault Line area, especially intense in the area of these new wells. The larger producer, J. E. Clark's No. 1 Larison is flowing steadily from a crevice in the Austin chalk. Since production in the Darst Creek field produces from the Edwards lime, and the oils of the two pools differ in characteristics, many operators believe the new production is distinct and separate from the Darst Creek field 2 miles away. As a result of the two recent strikes, three new locations were announced this week. J. E. Clark, whose No. 1 Lay was the discovery well, has formed two oil companies with his associates, to be known as the Doody Oil Co. and the Amy Oil Co. These companies will drill one test each on the Lay and Larison leases respectively, and Stegal and Gallagher will drill an offset to No. 1 Lay producer brought in last week. The life and extent of the field is yet unknown, but the new field is scene of the most active play for the Fault Line in a long while.

Bandera, Gonzales, Dimmitt

In Bandera County, Plateau Oil Co. reports a gradual softening of the shale. The well is now drilling below 4,932 feet. This 6,000-foot test is 8 miles southwest of Medina. Inter-Allied Oil Co.'s No. 1 Wells, Gonzales County wildcat, is standing at 4,075 feet awaiting orders. Caldwell also came into the picture in the Fault Line with two locations for wildcats. P. M. Armstrong is building derrick on his No. 1 Dunlap location and W. H. Jennings has made location for No. 1 McMahon. Toward the west in Dimmitt County, Diamond Halff Oil Co.'s No. 1 Eardley estate wildcat was plugged and abandoned at 4,250 feet after a Schlumberger test had been run. The derrick is being skidded for a core test in the immediate area.

Lopez Pool

Another indication that the Lopez pool in eastern Webb County will develop into a major producing area was seen this week in the showing on a drill stem test of Nixon and Tabot's No. 1 Billings. The well which is midway to the west in section 113, between the Lopez pool proper and Lewis' No. 1 Lopez, recent south extension discovery, made 275 feet of oil on a 10-minute drill stem test at 2,172-77 feet. This broadens the Lopez field considerably to the west and marks production between the field and the 2-mile extension. Two offsets to the Lewis well were under way this week. G. G. Mortimer is rigging up his No. 1-A Lopez, north offset in section 111, and Superior Oil Co. of California is drilling below 1,760 feet on the west offset in section 109. In the Lopez field to the north, Mills Bennett Production Co. completed No. 2 M. Lopez for 8 bbls. per hour on a three-eighths inch choke at 2,227 feet and made location for No. 1 Montemayer in Survey 114.

Goliad County

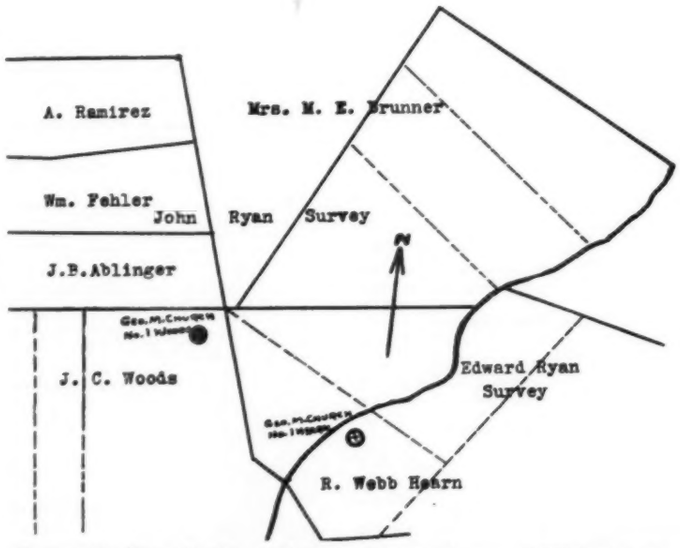
Considerable interest is being directed to the new Hords Creek field in Goliad County. After completing No. 1-C Kaufman as the first large Conroe sand producer in Southwest Texas, Brown and Wheeler have moved back to No. 1 Kaufman, discovery well, and deepened it. It was drilled to 4,566 feet and plugged back. Production will be attempted at the same level as the second well, and completion of as large a well is expected next week. Sun Oil Co. is digging pits for No. 1 Kaufman, same field, and M. I. Richardson has announced a location in the south corner of his 40-acre Kaufman lease.

Nueces County

Nueces County experienced no letdown from the intense activity of the past few weeks. LaJita's No. 1 King, wildcat in the western end of the county, is making a light oil, not yet gauged, but indications point to the development of a field. The Saxet field is due for an active drilling period with six locations announced and one completion. Conservative Oil Co.'s No. 1 Hutchins blew out during the week making sulfur water and gas. It cratered the hole to some extent but was killed with cement. Houston Oil Co. completed No. 5 McGregor for a 500-bbl. well and made five new locations on the Walton, Morgan, Harrell and Hunter leases. Texon Royalty also made a new location on the Taggart least. No new location has yet been announced in the vicinity of Coulton's No. 1 Baldwin, north of Corpus Christi, but one is rumored in the near future.

Duval County

Duval County continued the most active county from the standpoint of drilling rigs, completions, etc., and developments were more scattered than usual. Loma Novia gained 7 new producers and 12 new locations. Among the week's completions were: Hamill Smith and Ogden's No. 22 Hubbard in Survey 77, brought in for 740 bbls. per day on a one-half-inch choke; No. 26 Hubbard in Survey 77, making 330 bbls. per day on a one-half-inch choke with sand at 2,671-88 feet; Shell Petroleum Corp.'s No. 9 Hubbard, in Survey 77, which made an initial of 51 bbls. per hour with casing pressure of 640 pounds; Reynosa Oil Co.'s No. 2-B Mary Davison in Survey 114, a 38-bbl.-per-hour well bottomed at 2,596 feet; and Bridwell Oil Co.'s No. 2 B. C. C. which made 100 bbls. per day from sand at 2,681 feet. Possible extension of the Loma Novia Field on the northeast is shown by Humble Oil & Refining Co.'s No. 4-C Welder, 660 feet south line and 1,320 feet west line of Survey 554. This well had sandy shale at 2,701-05 feet with a show of oil and is swabbing.



George M. Church's No. 1 Heard test is rigging up 2,000 feet east of Church's No. 1 Wood, which recently opened new production in Bee County, near Beeville, Southwest Texas

Seven Sisters

The Seven Sisters field took a large share of Duval County attention with four completions and several critical tests drilling. The four good producers completed were: Atlantic Oil Producing Co.'s No. 1-B Welder in Survey 385 making 550 bbls. per day on a one-quarter-inch choke and casing pressure of 310 pounds; Santa Clara Oil Co.'s No. 10 Wood-Welder, Survey 385, completed for an initial of 27 bbls. per hour and maintaining casing pressure of 845 pounds; Buchanan-Blanco Oil Co.'s No. 2 Wood-Welder flowing an estimated 24 bbls. per hour with total depth at 2,476 feet; and Dulce Oil Co.'s No. 4 Serna making 35 bbls. per hour at 2,499 feet. At present there are drilling one eastern outpost well, one western one and two on the southern edge. None has reached the stage of determining the field.

Elsewhere in Duval County one oil well and one gasser were completed and two tests were abandoned. In the Sarnosa field south of Government Wells Seaport Oil Co. brought in No. 16-A D. C. R. C. on the pump for 25 bbls. per hour. Magnolia Petroleum Co.'s No. 2 Labbe, like No. 1 discovery well, was a gasser making an estimated 25,000,000 feet per day. The Piedra Lumbre field has been defined on the southeast by Texas and Ohio Fuel Co.'s No. 1 D. C. R.C., in Survey 96, abandoned at 2,753 feet.

Rio Grande Valley

In the Lower Rio Grande Valley wildcatting continued to hold greatest attention, with completions being attempted in Willacy and Hidalgo Counties, and new locations in Hidalgo County. King-Wood Oil Co.'s No. 1 Santa Rosa has been plugged back for perforations at 6,025-52 feet after swabbing salt water at 6,519 feet. The 6,025-52-foot range showed as sand in a Schlumberger survey. S. J. Sloan's No. 1 Brock & Showers is awaiting orders after flowing salt water at 4,666-69 feet and 4,674-77 feet. These perforations were recemented and plans call for a test at 4,620-59 feet on strength of the drillers' log. Two wildcats are getting under way in Hidalgo County. Dale L. Smith's No. 1 Fairbanks & Young, 4 miles east of Samfordyce, is rigging up, and King-Wood Oil Co.'s No. 2 Osca Daskam is moving in material.

Starr County

Starr County gained a new wildcat last week in Hiram Reed's No. 1 Starr County Cattle Co., in Block 66 of Porcion 89.

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Among Gulf Coast Drilling Contractors

Nickols Drilling Co. completed the second producer in the recently discovered Tepetate field, Acadia Parish, Louisiana, for Continental Oil Co. and has received contracts for two more tests being No. 1 Kern and Marcantel, both of which will be drilled to the 8,300-foot sand.

Smith and McDannald have apparently opened another field for Tide Water Oil Co. on the Smedes lease in St. Martin Parish, Louisiana, which is now shut in after flowing oil and distillate on a production test made in sand at a total depth of 5,842 feet. At Big Hill for Stanolind Oil & Gas Co. they have drilled through 800 feet of heaving shale and have cemented casing for a production test in oil sand bottomed at 6,609 feet. In the Louise field, No. 1 Garrett has been completed as a producer and the rig is being moved to the McIntyre lease for the same company. At Mauritz, Jackson County, No. 1 Mauritz has been abandoned at 6,714 feet. Seven other rigs are on locations previously reported.

Alamo Drilling Co. has one rig running on a wildcat test in Fort Bend County for C. B. Bunte which is drilling below 3,500 feet.

W. C. (Claud) Smith has spudded in for No. 3 Hillegiest for the Texas Co. in the Tomball field, Harris County.

H. J. Porter is rigging up on a wildcat test in Live Oak County to be drilled for Wheelock and Collins. He has another rig on location for himself in the Samfordyce field, Hidalgo County.

W. V. (Bill) Bowles finished a producer for Texas Co. at Batson field in Hardin County and is drilling another hole for the same company in the Manvel field.

J. E. Hooper is preparing to complete No. 1 Kastner for Cliff Camp in the Coletto Creek field, which is bottomed in the 2,800-foot sand and has three other rigs ready to spud on wildcat prospects in San Jacinto and Harris Counties.

Edwards Drilling Co. has spudded No. 1 Marshall for the Domestic Exploration Co. in the Anahuac field and has two active rigs located in Louisiana and South Houston.

Rutherford Drilling Co., after a series of production tests, has proven two productive sands for the Bay City field, Matagorda County, by completing No. 1 Cobb and No. 3-B Cobb for Skelly Oil Co. The two sands were found at 7,488 and 8,228 feet and have turned this field, originally discovered as a gas field, into an oil pool. The company has two other rigs, running, one in the same field and the other at Samfordyce.

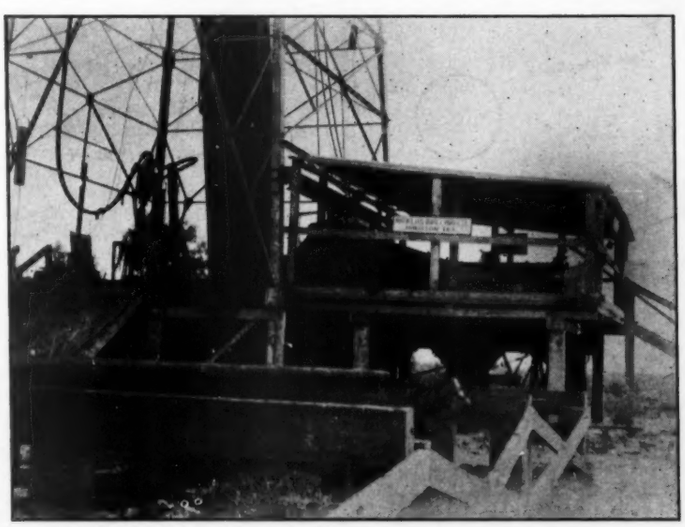
Glenn McCarthy completed No. 3 White in the Anahuac field for Humble Oil & Refining Co. and is rigging up No. 4 White on the same lease. At Conroe his new heavy rig has been moved to his Bertrand lease for No. 2 Bertrand.

George Echols completed No. 2 Marek for Sun Oil Co. at the Placedo field and is drilling below 3,500 feet on No. 1 Schneider for the same company. One of his rigs was lost when No. 1 Henderson and Pickering which was drilled for the Westgate Oil Co. blew out and caught fire while it was being prepared for a completion test. He has two rigs running at the Sinton field for Sun Oil Co. and has started No. 8 Castle in Gillis field for Fohs Oil Co.

V. F. Neuhaus of McAllen has contracted together with E. A. Graham to drill Hill and Hill's No. 1 Guerra in the Samfordyce field, Hidalgo County.

Al Buchanan, San Antonio, completed several wells in San Patricio and Duval Counties in the past week and moved rigs onto several other locations. In the Loma Novia field pro-

(Continued on Page 118)



Nicklos Drilling Co.'s rig used in drilling the discovery well for Continental Oil Co. in the Tepetate area, northern Acadia Parish, Louisiana. The oil sand in this field is found below 8,000 feet and the company recently completed a second well and has received contracts for two more tests

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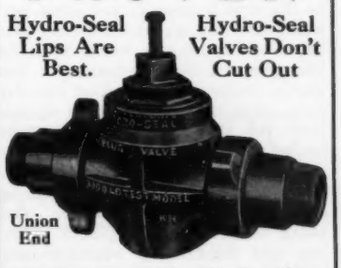

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Texas and Louisiana Gulf

PROJECT IN ST. MARTINSVILLE IS NEWEST LOUISIANA FIELD

By
F. L. SINGLETON

HOUSTON, Tex., Nov. 11.—The St. Martinsville prospect, located in the southern part of St. Martin Parish, Louisiana, was added to the list of productive fields on the Gulf Coast when Tide Water Oil Co.'s No. 1 Smedes, situated in section 57-11s-6e, flowed oil and wash water from sand bottomed at 5,582 feet and is now shut in awaiting the erection of separators and storage tanks. The log of the well showed sand saturated with oil from 5,551-79 feet, and after an electrical survey was made of the hole which showed sand from 5,542-79 feet, 9⅝-inch casing was cemented at 5,555 feet and the following screen setting was made: 2 feet, 1 inch of back pressure valve on bottom of 29 feet of 3 inches of 7-inch .012-gauge screen, 64 feet 8 inches of 7-inch blank liner with 5 feet of packer on top, sealed in the casing. Two and one-half inch tubing was swung at 5,563 feet and the well was washed for one hour and a half and when it began to clean itself it was closed in overnight to tie the christmas tree down. It was opened on November 4 and flowed at the rate of 135 bbls. of fluid per day through a three-sixteenths-inch choke, estimated 25 per cent oil and 75 per cent wash water and sand with tubing pressure 1,500 pounds and the gravity of the oil at 33.7. It was allowed to clean itself, but when it began to show an increase in gas and a decrease in oil the valves were closed and it is standing with a shut-in pressure of 2,000 pounds on the tubing and 2,200 pounds on the casing. At the time the well was shut in it was estimated making 100 bbls. of distillate per day.

St. Martinsville was looked upon as a favorable prospect for a number of years. First attention was attracted to the area because of gas seeps, paraffin dirt and report on former geophysical exploration work. North of the prospect, Gulf Refining Co. and Bayou Teche Oil Co. drilled two dry holes after the area had been worked with the torsion balance. The Tide Water Oil Co. started leasing in the area the first part of the year after the structure had been outlined by the Independent Exploration Co., using reflection seismographs shooting and blocked up approximately 4,000 acres. The well was scheduled to be drilled to 9,000 feet but encountered its first showing shortly after it topped the Florida Miocene sand at approximately 5,000 feet. Continental Oil Co. and Standard of Kansas hold leases near the well.

Cameron Parish

The Big Lake prospect, north central Cameron Parish, was being looked upon as another possible pool opener, due to preparations being made to test Magnolia Petroleum Co.'s No. 1 J. B. Broussard in section 13-12-9w, which is bottomed in shale at 9,499 feet. Seven-inch casing was being run to be cemented on bottom. Several sands between 7,500 and 8,000 feet which were indicated on an electrical coring test will be tested through casing perforations. The first test will be made in the deepest sand and if it is unsuccessful, perforations will be made in higher sands until all have been tested.

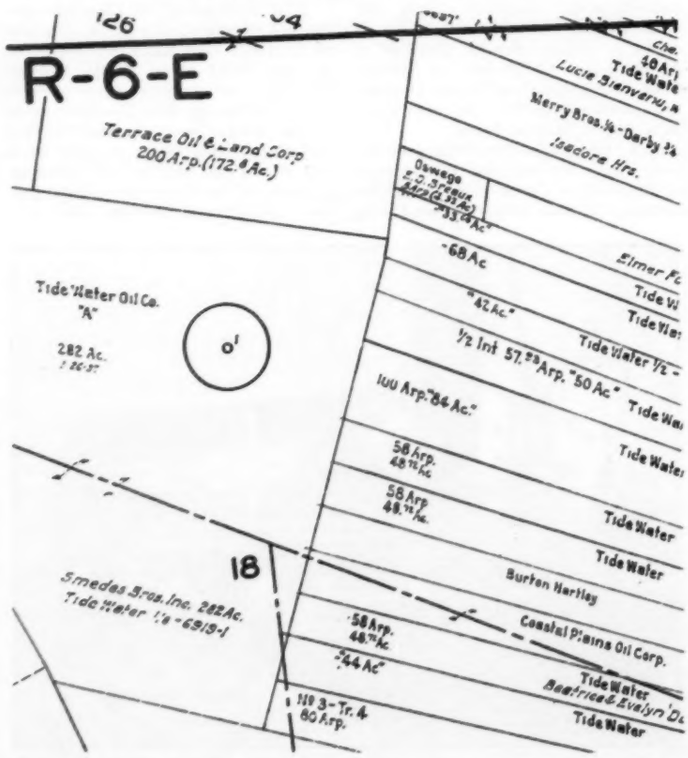
This is the first test to be drilled by the company on its block of 17,000 acres which is situated east of Hackberry and 5 miles northwest of Sweet Lake.

Tepetate

The Tepetate field, Acadia Parish, received its third producer by the completion of Continental Oil Co.'s No. 1 Klumpp, which extended the field about 1,500 feet when it was completed for an initial production of 1,080 bbls. in 24 hours through a three-eighths-inch choke with tubing pressure 600 pounds and casing pressure 900 pounds. Gravity of the oil tested 37. It was originally drilled to 8,999 feet and was plugged back to 8,335 feet, where it was completed through perforated casing from 8,324-34 feet. West of the discovery well the company's No. 1 Homeseekers Development Co. in section 29, made a drill stem test from 8,493-8,518 feet and showed 300 pounds of pressure. It is being plugged back to 8,305 feet. Three locations were announced by Continental Oil Co. No. 1 A. D. Mercantel is 990 feet south and 660 feet west of the NE cor. of section 29-7s-2w. In section 22, derrick is being built for No. 1 Macabee, 990 feet north and 660 feet east of the southwest corner of a 160-acre tract. A rig is being moved in for No. 1 Kern, situated 1,610 feet south and 660 feet west of the SE cor. of Section 29-7s-2w.

Rapides Parish

Amerada Petroleum Co.'s No. 1 Wells Land Co., located on the "Conroe trend" in Rapides Parish, cored sand showing gas from 6,722-32 feet and on a 15-minute drill-stem test from 6,718-34 feet it showed 8 stands of gas-cut mud and 13 stands of salt water with 25 pounds of pressure through a one-quarter-inch choke. The operators made an electrical coring test which showed sand with 8 ohms resistance from 6,722-32 feet and it is now being plugged back to test. Much attention was given the well a few weeks ago when it showed gas, oil and salt water in the Cockfield sand from 5,600-97 feet. Location is in section 63-1s-2e.



Tide Water Oil Co.'s No. 1 Smedes, discovery well of a new field in southern St. Martin Parish, Louisiana, which showed oil and distillate on a production test made in oil sand bottomed at 5,582 feet. The location of the well is in section 57-11s-6e
(Map courtesy W. W. Zingery, Esperson Building, Houston)

Shepherds Mott

The prospects of H. M. Smith's No. 1 Wadsworth, located on the west flank of the Shepherds Mott dome, Matagorda County, of becoming a commercial producer still remains in doubt. After it had been swabbed down to 3,000 feet and started showing salt water, it was shut down until November 4, at which time swabbing was resumed and it showed oil with a slight flow of gas and a taste of salt water. It was shut down again and after swabbing was resumed November 7 it kicked off and began flowing, making oil with a slight amount of salt water. It is estimated to have made from 50 to 75 bbls. of oil, and at one time was flowing from 5 to 10 bbls. per hour through a one-quarter-inch choke, but at the close of the week it had stopped flowing and was making an occasional head of oil and salt water.

Bay City

Two new sands for the Bay City field, Matagorda County, were proved productive by the completion of two wells by Skelly Oil Co. Its No. 1 Cobb, the discovery well, originally completed for a distillate producer at 7,045 feet, was deepened, and topped the second sand at 7,454 feet and cored to 7,488 feet, the total depth. Five-inch casing was cemented at 7,487 feet and when tested through perforated casing at 7,468 feet it flowed 199 bbls. of pipe-line oil through a three-sixteenths-inch choke with tubing pressure 930 pounds and casing pressure 1,980 pounds. Gravity of the oil tested 37. To the northeast about 1,500 feet No. 3-B Cobb extended the field when it flowed 48 bbls. in eight hours through a one-eighth-inch choke with tubing pressure 975 pounds and casing pressure 1,000 pounds. It was drilled to 8,708 feet and was completed through perforated casing from 8,228 feet.

Old Ocean

Harrison and Abercrombie's No. 2 Bernard, located in the Old Ocean field, southwestern Brazoria County, extended the field north approximately 1,000 feet when it was washed in from a screen setting made at a total depth of 8,657 feet and flowed 31 bbls. of 67.8 gravity oil per hour through a one-quarter-inch choke with tubing pressure 1,600 pounds. It was completed in 14 feet of Frio sand topped at 8,643 feet. Seven-inch casing was cemented at 8,580 feet. Location is in the Charles Breen Survey.

Cotton Lake

Salt Dome-Gem Oil Co.'s No. 1 Lawrence, situated in the Cotton

Lake area, is bottomed at the contract depth of 7,005 feet and is preparing to make a drill-stem test in sand which showed about 4 ohms resistivity on an electrical coring test. The presence of a salt-water sand that was cored from 6,820-25 feet has dimmed its chances of making a producer considerably, although oil shows were reported from 6,555-64, 6,631-35 and 6,769-74 feet. If it fails to make at producer it will not condemn the area, but is expected to lead to more development. Location is in the James Grant Survey.

Harris County

With four wells preparing to test oil sands at various depths at the South Houston field, Harris County, the importance of this field will probably be known during the week. On the west side of the field in district No. 5, Stanolind Oil & Gas Co. is running 7⅝-inch casing to 3,846 feet to test an oil sand that was topped at 3,845 feet and cored to 3,862 feet. On a 15-minute drill stem test from 3,850-62 feet, it showed 1,320 feet of oil and 38 pounds of pressure. This is the shallowest sand to be encountered in the field. Farther north in district No. 22, Stanolind is reaming to set casing in oil sand bottomed at 3,958 feet. In the south part of the field in district No. 10, 1,260 feet of salt water was tested from 4,118-40 feet and it is drilling below 4,540 feet in shale. The company's district No. 19 topped oil sand at 4,102 feet and cored to 4,118 feet, where it showed 26 bbls. of oil with 38 pounds of pressure and cemented 7⅝-inch casing has been cemented at 4,096 feet. On the west side of the field and outside of the townsite, Diadem Oil Co.'s No. 1 Dean in Block 6, Mary A. Nichols Survey, cored shaley sand with an oil show from 4,726-47 feet. The Discorbis was topped at 4,325 feet.

Galveston County

In the northern part of the Anahuac field, Galveston County, Humble Oil & Refining Co. completed No. 2 E. E. Townes for an initial production of 18 bbls. per hour through a one-quarter-inch choke with tubing pressure 1,900 pounds and casing pressure 2,500 pounds. The Oil sand was topped at 8,004 feet and cored to 8,054 feet, the total depth. Location is in the B.B.B.&C. Survey. Due south in the John Sellers, the company's No. 1 E. E. Anderson made a drill-stem test from 8,899-9,127 feet and it flowed 8 bbls. of oil and 15 per cent drilling mud with 2,200 pounds of pressure. It is being killed to work over.

Wharton County

Sterling Oil & Refining Co.'s No. 1 Janik, located in the northeastern part of Wharton County, opened the way for further development in the area when it was plugged back to 7,875 feet and flowed oil, gas and salt water with the gas pressure reported at 1,000 pounds. Location is in the Jonathan Scott Survey. The well was drilled on "farmed-out" acreage held by the Tide Water Oil Co.

Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Nov. 9.—Detailed figures show that in September 105,442 bbls. of the total Alberta production of 109,143 bbls. came from Turner Valley. Royalite Oil Co. was the major producer with 52,390 bbls., an increase of 4,186 bbls. over the previous high figure in August of 48,204 bbls., largely due to the second Royalite absorption plant in South Turner Valley. The Mercury-Miracle ranked second with 15,120 bbls., and Model Oils, Ltd., third with 4,953 bbls. Century Royalties' No. 1 was the largest well and fourth producing unit with 4,695 bbls. and Highwood-Sarcee Oils' No. 1 fifth with 3,926 bbls.

North Turner Valley

In North Turner Valley, Model Oils' No. 3, LSD 1, section 22-20-3w5, got the Madison limestone at 5,734 feet and cemented 6⅝-inch casing at 5,755 feet. It has started drilling into the lime. Model's No. 1, a half mile north, got the lime at 5,803 feet and production 82 feet lower. Model's No. 3 is close to a drilling record, having made the first 500 feet with cable tools in eight days; and the remaining 5,255 feet with rotary in 118 days. Royalite Oil Co.'s No. 27, LSD 4, section 23-20-3w5, is below 799 feet after making water shutoff at 405 feet.

Border Fields

On the Del Bonita structure near Lethbridge, in southern Alberta, Terminal Oil Co.'s No. 1, NE section 18-1-21w4, has cable tools rigged to resume from 4,895 feet where 6⅝-inch casing was cemented on top of the Madison lime.

Drilling in Saskatchewan

In the Lloydminster field, western Saskatchewan, Colony Oil & Gas Co.'s No. 3, 1½ miles east and a half mile south of No. 2 gasser, has spudded. It is expected to get the gas horizon early in December .

In northern Saskatchewan, Hudson Bay Junction Oils, Ltd., has been incorporated under Saskatchewan charter to drill a test on the northeast end. Location was made by W. B. Fry, geologist. The new company will consolidate acreage held by Trail Blazer Oil & Gas Co., Amalgamated Oils and other interests which are cooperating. At Kakwa, Amalgamated Oils' No. 8 deep test is drilling. The outfit has been housed for winter drilling and gas from Amalgamated's No. 7 shallow test is being used for fuel. Indications are the structure at this point rises about 100 feet from Hudson Bay Junction where Trail Blazer's No. 1 last year got a show of heavy crude at 590 feet.

Drilling in Ontario

In the Dover field, Kent County, Ontario, E. P. Rowe's No. 1, Duphette farm, SW Lot 2, Concession 4, Dover East Township, finished some weeks ago as a gasser with a shot production of 4,750,000 feet a day from the Trenton limestone at 3,028 feet, has turned to oil, and is spraying considerable crude. It is reported making around 10 bbls. a day though the oil is apparently shutting off the gas. Ajax Oil & Gas Co.'s No. 11, Lot 2, Front Concession, got the Trenton limestone at 2,903 feet and set casing at 2,910 feet. At 40 feet in the Trenton it had about 100,000 feet of gas per day. South of the River Thames, E. P. Rowe's No. 1, Bruette farm, Lot 5, Front Concession, Raleigh Township, is installing pump to take production from the Trenton limestone around 3,269 feet. It was swabbing between 8 and 15 bbls. a day.

In Chatham Township, Kent County, Union Gas Co.'s No. 1, SW Lot 5, Concession 13, is below 1,700 feet after getting a small show of crude, apparently in the Salina formation, around 1,620 feet.

In the Eden field, Elgin County, C. A. Simpson and associates have located No. 4 in Bayham Township about a quarter mile west of No. 3. David Lauer is moving to the Williams farm, Bayham Township, where he will drill Central Pipe Line Co.'s No. 2, about 1,000 feet south of No. 1 on the N. H. Gray farm.

Olga Oil & Gas Co. of Toronto has secured acreage in Bayham Township adjacent to the Ball lease and will drill No. 1 this month. Gas production has been contracted to the southern Ontario Gas Co. at 30 cents per 1,000 feet.

Ribstone Field

In the Ribstone field, eastern Alberta, Dina Oil & Gas Co. has purchased the equipment and surface rights with between 400 and 500 acres of oil rights from Ribstone Oil Co. The purchase includes Meridian Oils' No. 2, LSD 4, section 16-45-1w4, which for a time produced a fair quantity of heavy crude from 1,802 feet. The Dina company is planning to clean and deepen the Meridian well. The Dina company is financed by eastern Alberta interests and operations will be in charge of J. L. Wilson. The Ribstone structure was mapped by Dr. G. S. Hume of the Geological Survey of Canada about 1926. The first test by Imperial Oil, Ltd., was abandoned after getting shows of crude at 1,870 and 1,900 feet. Later Meridian's No. 1, LSD 3, section 16-45-1w4, got a fair production at 1,827 feet. The Meridian company drilled two other producers in the same section, and Imperial Oil got a producer in section 9-45-1w4. The production was from the lower Cretaceous. Ribstone Oils drilled No. 2 in LSD 5, section 25-46-1w4, into the Paleozoic lime, but failed to get production in the lower horizon. Production was taken from the Cretaceous horizon for several months, but ultimately the wells were shut down.

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California Field Report

By
L. P. STOCKMAN

EXTENSION OF MONTEBELLO PROVES CENTER OF INTEREST

LOS ANGELES, Calif., Nov. 11.—Universal Consolidated Oil Co., discoverer of the Montebello extension in Los Angeles Basin, focused attention on this district early in the week by completing No. 1 Estrada flowing 1,606 bbls. of 38.6 gravity and 1,400,000 feet of gas per day and may have another well tanking oil before the close of another week. No. 1 Estrada, in close proximity to the company's No. 1 Cruz and No. 2 Nutt, was bottomed at 5,607 feet and has a 9-inch water string landed and cemented at 5,548 feet. Universal has beaned back its new well to 930 bbls. per day and pressure has built up to 225 pounds on the tubing and 1,060 pounds on the casing. Universal's No. 1 Farmer, also in the Montebello extension, appears almost certain of substantial production, as on a recent formation test it blew drilling mud and gas over the crown and yielded 65 stands of oil. It was drilled to 6,627 feet and casing has been landed and cemented at 6,530 feet preparatory to production test.

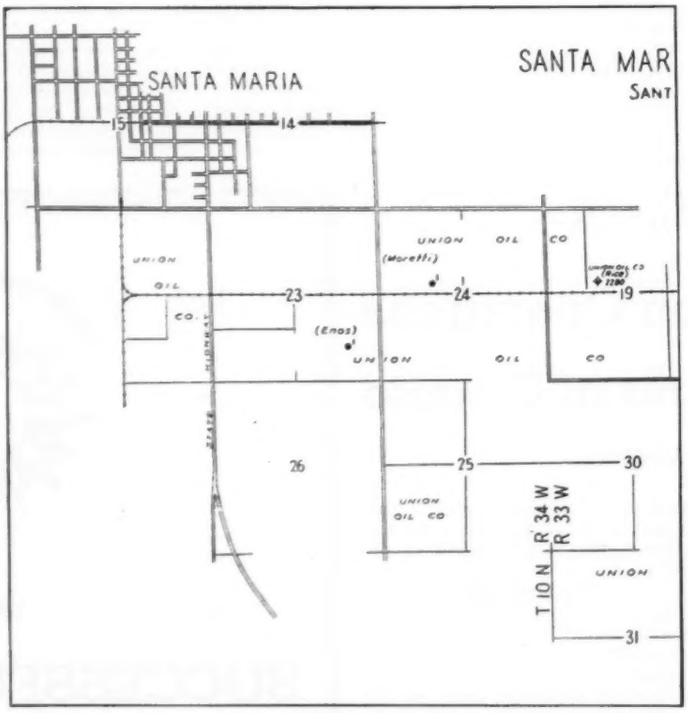
Dominated by Fault

The eastern extension of the Montebello field has been an enigma but it has become evident in recent weeks the structure is dominated by a fault which resulted in considerable fracturing. This precludes correlation of subsurface conditions in wells only a few hundred feet apart, especially in areas bisected by the fault. The Montebello extension appears to consist of two separate productive areas, although this will not be determined until additional wells are drilled and structural conditions ascertained. Sufficient data are not available to establish the extent of the possibly productive acreage, although it has been rather definitely proved there is some fracturing or faulting between the two productive areas. Wilshire Oil Co., although it has suspended drilling operations in No. 1 Pellissier, is still working on No. 1 Afheldt in section 5-2-11 and No. 1 Baldwin in section 11-2-11. A whipstock was recently landed and cemented in No. 1 Afheldt at 5,691 feet preparatory to redrilling the hole. Texas Co., with two drilling wells to its credit, is preparing to drill out No. 13 Baldwin following landing and cementing of a string of 11¾-inch at 5,363 feet, but is being held up with mechanical trouble in No. 1 City of Whittier in section 5-2-11 at 7,276 feet due to the loss of a string of drill pipe. Signal Oil & Gas Co. picked up a rather promising oil sand in No. 1 Lapworth in section 4-2-11 at 2,702 feet and although it was not continuous, another promising showing was logged at 2,818 feet. These showings correlate considerably higher than similar indications in Woodward Oil Co.'s No. 1 Lapworth in the extreme eastern end, which is producing 92 bbls. of 28.4 gravity per day, and the outlook at 2,900 feet is encouraging. Hillman & Long and Oil & Gas Associates made good footage in their respective tests during the week, but neither has logged anything of importance. The latter had some bailer trouble but is back in the hole after a suspension of 48 hours.

Standard Oil Co. finished an excellent producer in the old section of the Montebello field early in the week when No. 78 Baldwin was brought in flowing 656 bbls. of 26.4 gravity and 600,000 feet of gas per day from 3,835 feet. It has an 8⅝-inch water string landed and cemented at 3,605 feet and was finished with a 6⅝-inch liner carrying 231 feet of perforated and 3,768 feet of 2½-inch tubing. The development of commercial production in the area adjacent to the Montebello field is of interest because of the inability to develop similar deep production within the original Montebello field. Production in the Montebello extension is coming from rocks of Miocene age and, although several wells in the Montebello field were carried into the Miocene, they failed to result in commercial production. There is still a possibility deeper production in the Montebello field may be productive of satisfactory results, although this may necessitate drilling of wells to extreme depths. The productive area of the Montebello extension is substantially less than proved acreage in the original field and, although the new area would on this basis be expected to show a proportionately lower ultimate recovery, this may not be the case because if Miocene production has been developed in the eastern extension, deeper drilling may result in the development of production in formations of Oligocene and Eocene age, whereas these lower formations may prove barren within the productive limits of the older section.

Semi-Tropic

Standard Oil Co. completed two new wells in the Semi-Tropic gas field of Kern County. No. 1 Pioneer Fruit, section 16-27-23, was brought in flowing 12,580,000 feet gas per day from 3,216 feet after the hole had been finished with a 6⅝-inch liner including 29 feet of perforated and 3,197 feet of 3-inch tubing. No. 2 Pioneer Fruit was bottomed at 3,051 feet and finished with a 6⅝-inch liner carrying 46 feet of perforated and 3,030 feet of 3-inch tubing. It registered an initial daily production of 14,100,000 feet of gas and upon being shut in pressure built up to 600 pounds on the tubing and 1,240 pounds on the casing. Two abandonments were chalked up, Standard pulling out of No. 1 Thompson in section 1-27-22 because of the unfavorable outlook at 3,876 feet and Fullerton Oil Co. abandoning No. 31-23 in section 31-27-24 at 3,453 feet. A formation test of the Mya was negative in the latter well as this zone carried neither gas nor water. Fullerton Oil Co. has a location staked for No. 31-36 in section 31-27-24. Standard, which is redrilling No. 1 Chapman and drilling in No. 7-1 K.C.L. and No. 8-1 K.C.L., should spud in No. 1 Redding within a day or two. On the K.C.L. lease in section 34-27-24, Superior Oil Co. is nearing the 5,500-foot level in No. 2-A, being carried down as a deep test.



Section of Santa Maria Valley Field, Santa Barbara County

The aggressive development of the gas fields during the year was predicated on the assumption these fields would be called upon to go on commercial gas production during the winter. This possibility still exists but the gas required during peak consumption may be substantially lower than anticipated unless production of the Kettleman North Dome field is severely restricted either by mutual agreement or as the result of litigation instituted by the California Department of Natural Resources. Attempts by operators to get together and restrict production have been unsuccessful, but discussions are still under way and may result in an acceptable allocation program.

Kettleman Hills

The Kettleman North Dome Association finished a well in the Kettleman North Dome field early in the week, but unlike other recent completions, failed of substantial production. Kenda's new producer, in section 28-21-17 just inside the red line enclosing what is considered proved acreage, failed to result in a natural flow and was put on a compressor. This producer, No. 23-28-J, showed an initial daily production of 760 bbls. of 37.7 gravity following completion at 7,858 feet. The 9⅝-inch water string was landed and cemented at 7,493 feet and the hole finished with a 6⅝-inch liner carrying 109 feet of perforated. Operators in the North Dome contemplate starting of several wells and a number of locations have been staked in addition to the new rigs in course of construction.

New locations staked in the North Dome include Standard's No. 27-19-J, No. 34-19-J, No. 67-29-J and No. 2-33-J. New rigs in course of construction include Kenda's No. 27-20-J, No. 47-20-J, No. 87-20-J, No. 43-28-J and Standard's No. 45-19-J, No. 72-19-J and No. 6-27-J. There are a number of potential producers nearing completion. Kettleman North Dome Association has No. 8-18-J and No. 47-18-J in the oil sand and is reaming No. 34-28-J, No. 41-30-J and No. 21-32-J preparatory to setting casing. Within a day or so, Standard should complete No. 34-35-J, as this well,

bottomed at 8,500 feet, is being drilled out after having been cemented through perforations at 8,350 feet. It will produce from several selected points as the 7-inch includes perforations at 7,700-7,828 feet, 7,899-8,105 feet, 8,200-8,291 feet and at 8,350-8,495 feet.

Buttonwillow

The Buttonwillow gas field of Kern County has been making commercial deliveries of gas to Pacific Gas & Electric Co. for several months, but the daily production, approximately 20,000,000 feet, represents only a small part of its potential. This field is capable of producing approximately 100,000,000 feet under normal conditions. Gas production in the Kettleman North Dome field will exert a pronounced effect on production of all dry gas fields with the possible exception of Buttonwillow. Milham Exploration Co., discoverer of Buttonwillow gas field, has a priority right with Pacific Gas & Electric Co. secured previous to discovery of the Kettleman North Dome field and is in position of being able of fulfilling its contractual obligations by delivering gas from either Buttonwillow or North Dome field. Standard Oil Co., which has a 50 per cent interest in the Stan-Pac line with Pacific Gas & Electric Co., will probably be in a position to move gas from the Semi-Tropic gas field through this line to the San Francisco Bay region. Due to these old alliances, Amerada Oil Corp. may not be able to capitalize on its discovery of the Tracy gas field until next year notwithstanding this new gas field is only approximately 80 miles from San Francisco. Amerada is producing a limited quantity of gas from the discovery well and is proceeding with additional drilling.

The productivity and areal extent of the Buena Vista gas field of Kern County is conjectural due to limited development. This field was discovered by Ohio Oil Co. when No. 1 K.C.L. was completed flowing approximately 25,000,000 feet of gas per day. The company's second test, in section 32-31-26, was a duster and was abandoned at 5,563 feet. Ohio's No. 3 K.C.L. in section 31-31-26 is drilling at 5,415 feet, apparently running lower structurally as it is already deeper than the discovery. Shell Oil Co.'s No. 1 Buena Vista Associates, in the Buena Vista Lake district in section 9-32-25 and several miles from Ohio's discovery in the Buena Vista gas field, is being abandoned at 9,453 feet. Shell will conduct a series of tests on the way out and may possibly find one of the several zones productive. The hole has been plugged back to 5,885 feet and the casing will be perforated above where the last gas showing was logged.

The Chowchilla-Dos Palos area in San Joaquin Basin is experiencing a brisk leasing campaign as the result of a formation test conducted by Pure Oil Co. in No. 2 Chowchilla, in section 8-10-14. This formation test indicated the well was capable of producing approximately 1,500,000 feet of gas per day from the limited penetration. This gas is coming from approximately 2,400 feet and has a higher B.t.u. than gas from the lower zone. Pure Oil Co.'s No. 1 Chowchilla was completed as a gas well about a year or so ago from 8,402 feet, but the commercial importance of this deep zone has not been determined due to the low heating value of the gas. This well was good for approximately 50,000,000 feet per day and the volume and pressures indicate a substantial accumulation if the gas proves acceptable for commercial purposes. Standard Oil Co. added a well in the Delano gas field early in the week, No. 1 Bolz in section 33-24-23, brought in flowing 13,200,000 feet from 2,466 feet after the hole had been finished with a 6⅝-inch liner including 41 feet of perforated. Due to the absence of pipe-line facilities, this well was shut in.

Mount Poso

Texas Co. has completed No. 9 Vedder in the Mount Poso field of Kern County, pumping 380 bbls. of 16.7 gravity per day from 1,811 feet. Shell is completing two new wells, No. 5 Mathew-fee and No. 26 Vedder, which should be put on the beam within a day or two. General Petroleum has completed No. 49 Heisen pumping 510 bbls. of 16.4 gravity per day from 1,715 feet after the hole had been finished with a 6⅝-inch liner includ-

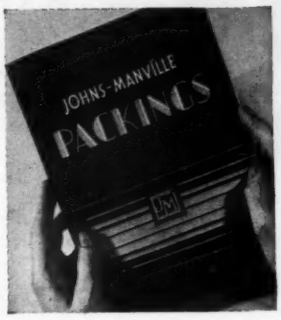
TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	October 27		October 20			
Intercoastal-domestic:	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Fuel oil	.....	.....	.....	.....	.....	10,985,479
Diesel and gas oil	36,531	5,219	.....	.....	563,629	1,098,288
Gasoline	5,088	727	.....	.....	6,165,978	6,672,127
Kerosene	.....	.....	.....	.....	753,457	898,666
Asphalt	.....	.....	.....	.....	.....	70,019
Other finished oil	.....	.....	.....	.....	.....	54,778
Foreign export:						
Crude oil	192,318	27,474	303,386	43,341	10,919,406	6,540,827
Fuel oil	534,453	76,350	250,459	35,780	10,477,070	10,701,955
Diesel and gas oil	132,298	18,900	79,062	11,295	3,761,667	3,347,333
Gasoline	53,383	7,626	284,821	40,689	5,576,347	3,738,465
Kerosene	42,590	6,084	50,699	7,243	1,056,199	1,461,730
Other finished oil	.....	.....	.....	.....	.....	37,955
Other unfinished oil	.....	.....	.....	.....	99,847	224,275
Coastwise-domestic:						
Crude oil	277,249	39,607	177,145	25,306	5,797,784	6,998,875
Fuel oil	225,106	32,158	149,186	21,312	7,900,359	7,936,759
Diesel and gas oil	7,201	1,030	8,054	1,151	1,038,027	603,864
Gasoline	288,586	41,227	338,183	48,312	9,369,944	10,937,646
Kerosene	2,901	414	4,588	655	157,386	130,537

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic:						
Fuel oil	.....	.....	.....	.....	.....	110,650
Diesel and gas oil	.....	.....	.....	.....	158,152	599,613
Gasoline	.....	.....	.....	.....	.....	365,283
Kerosene	.....	.....	.....	.....	149,715	276,593
Asphalt	.....	.....	64,183	9,169	484,597	.....
Lubricants	.....	.....	.....	.....	57,325	46,693
Foreign export:						
Crude oil	.....	.....	159,439	22,777	2,052,691	1,601,165
Fuel oil	112,419	16,060	20,168	2,881	1,949,991	1,859,969
Diesel and gas oil	9,028	1,290	.....	.....	913,679	1,164,102
Gasoline	9,880	1,411	108,355	15,479	2,493,206	2,605,526
Kerosene	.....	.....	.....	.....	627,396	1,004,660
Lubricants	.....	.....	.....	.....	173,507	161,291
Other finished oil	.....	.....	.....	.....	.....	2,760
Other unfinished oil	.....	.....	.....	.....	.....	5,750
Coastwise-domestic:						
Fuel oil	172,951	24,707	35,382	5,055	5,655,683	4,575,543
Diesel and gas oil	.....	.....	.....	.....	175,932	119,036
Gasoline	104,332	14,905	18,941	2,706	3,608,872	4,566,825
Kerosene	.....	.....	.....	.....	76,785	82,434

Packing Problems?



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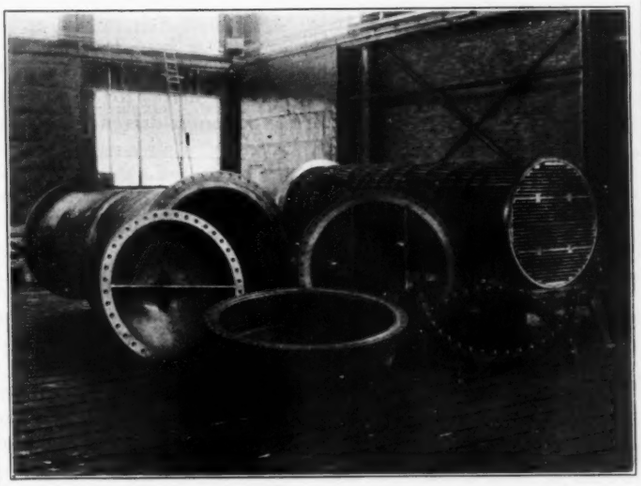

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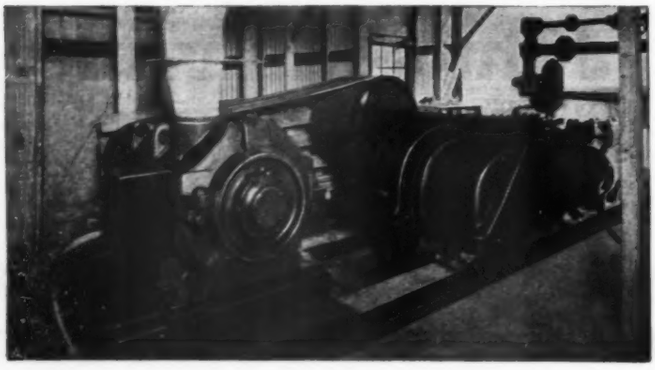

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005-23

GENERAL ELECTRIC

ing 61 feet of perforated. General Petroleum is putting finishing touches on a new rig for No. 4 Glide, which should be spudded shortly. Cliff Baker has recompleted No. 1 Glide and returned it to production pumping 152 bbls. of relatively clean 15.5 gravity per day after the hole had been plugged back from 1,730 feet to 1,675 feet. No. 2 Glide has also been plugged back and preparations are being made to perforate and cement through perforations. Three new wells are scheduled to begin making hole within a few days and several others are being prepared for production. The wells scheduled to begin drilling are Falcon Oil Co.'s No. 1 Poso in section 27-26-28, Archie Mayes' No. 1 in section 34-27-28 and Union Oil Co.'s No. 30 S. & M. in section 4-27-28.

The Midway-Sunset field of Kern County continues a consistent increase in drilling. New wells are being started by Alford Oil Co., California Commercial Drilling Co., General Petroleum Corp., Hallmark Oil Co., Pan American Petroleum Co. and Standard Oil Co. Richfield Oil Co. completed No. 10 Maricopa in section 36-12-24, but it was good for only 26 bbls. of 23.1 gravity per day on the beam from 2,362 feet. Standard Oil Co. has concluded drilling on No. 61 M. J. M. & M. at 2,360 feet and it is being passed for production. Standard is building a rig for No. 17-33-D and has material on ground for No. 62 M. J. M. & M.

Long Beach

Shell Oil Co., apparently dissatisfied with exploratory work in the northern edge of the Long Beach field, has started an outpost on the Amebco property, 1,750 feet north and 3,000 feet west from the center line of Wardlow and American Avenue. This is in the extreme northwestern end and west of the Los Cerritos section. Two wells were chalked up in Long Beach during the week although only one, Virginia Dare Oil Co.'s No. 1 Signal, can be considered commercially productive. Brought in pumping 122 bbls. of 28.1 gravity cutting 2 per cent from 5,650 feet, it was finished with 1,400 feet of 4¾-inch liner including 600 feet of perforations. Liner was landed at 5,650 feet and cemented through perforations at 5,050 feet. Shell Oil Co.'s No. 8 Babb-Tucker was brought in pumping 190 bbls. of 24.5 gravity per day, with a cut of 54 per cent and may necessitate remedial work. It was bottomed at 4,575 feet and finished with a 5¾-inch liner carrying perforations at 4,330-4,415 feet and at 4,493-4,575 feet and cemented through perforations at 4,490 feet. Morton & Elder have concluded drilling on No. 1 Nesa at 4,650 feet and have landed a 6⅝-inch liner carrying 60 feet of perforated. This well is being prepared for a test and should be completed within a day or two. Drilling operations in Long Beach appear tapering off. Fewer new wells are being started and a large number have been suspended.

Development work in most other Los Angeles Basin fields is lower than earlier in the year. This is especially true of Playa Del Rey, Inglewood and Dominguez. The decline at Playa Del Rey is because the period of flush production in the Palisades section is over. Union Oil Co. has considerable undeveloped acreage on the Vidor and Del Rey leases and is conservatively developing these properties. When operators started deep-zone development at Inglewood it appeared probable aggressive drilling might be expected but sale of properties of Pacific Western to Shell and K. & I. Corp. eased up the situation.

In Huntington Beach field, D. A. West is building a new rig over Utah-Cal Oil Co.'s abandoned well at Springfield and California Street and Westport Oil Co. is building a new rig in the Vista Del Mar tract No. 4. Devine-Thomas Oil Co. is making preparations to start a well at Huntington Beach. In the Santa Fe Springs field, Union Oil Co. is keeping four strings in operation and other operators are doing a limited amount of drilling and remedial work. At Seal Beach, Continental Oil Co. is rotating in No. 37 Bixby in the pay at 6,075 feet and should be ready for a production test within two weeks. Standard's No. 77 L. A. I. in the Inglewood field was good for 550 bbls. per day upon completion from 3,122 feet.

Mountain View

Seven wells are scheduled to be started in the Mountain View field of Kern County within the next 10 days. New work includes Buffalo Oil Co.'s No. 1 Canal, Hancock Oil Co.'s No. 9 Miller, Mohawk's No. 2 Bloemer, O'Kane & Brain's No. 2 Wright-Bloemer, Standard's No. 8 Ranton, and No. 8 Wible, Treasure Oil Co.'s No. 1 View and the Vesta Petroleum Co.'s No. 9 Hopkins. Standard, which is running seven strings of tools, should finish one within two weeks and Gilmore-Snyder Oil Co. should have No. 2 Mullaney completed during the week. The Edison field of Kern County will probably yield a new well within 10 days as General Petroleum's No. 1 Speed has been cemented at 1,735 feet following the conclusion of drilling at 1,895 feet and there is also a good chance Shell may have No. 4 Duff ready about the same time.

In the Fruitvale field in the San Joaquin Basin, Western Gulf completed No. 1 Sawyer-Reid a few days ago flowing 241 bbls. of 21.9 gravity per day following completion at 3,422 feet. It was finished with an 8⅝-inch water string landed and cemented at 3,451 feet and a 6⅝-inch liner carrying 83 feet of perforated. Immediately the company spudded No. 4 Sweitzer. Out in the Kern Front, Chanslor-Canfield Midway Oil Co. has completed No. 49 in section 23-28-27 pumping 186 bbls. of 15.8 gravity per day from 2,090 feet after the hole had been finished with an 8⅝-inch liner carrying 240 feet of perforated.

Ventura

Bankline Oil Co. got a nice producer on Calumet property in Shiells Canyon, Ventura County, when No. 1 was brought in flowing 530 bbls. of 37.1 gravity following completion at 3,634 feet. It was finished with an 8⅝-inch liner including 105 feet of perforated. Property Service Corp. has plugged back No. 3 Dabney-Lloyd in the Ventura Avenue field following failure to show production at 9,582 feet. In the Rincon field of Ventura County, General Petroleum recompleted No. 2 Needham after redrilling and deepening hole to 3,475 feet and returned it to production pumping 230 bbls. of 26.9 gravity per day. Honolulu Oil Corp. and General Petroleum have started new tideland wells but will not be ready for production tests for 30 days.

Michigan Field Report

NEW RECORD GAS PRODUCER BOOSTS MICHIGAN RESERVES

By PAUL A. ELLIOTT

MUSKEGON, Mich., Nov. 11.—The outstanding development in Michigan last week was the discovery of a record gas well good for about 40,000,000 feet a day. More important than the potential flow of this new gasser, Michigan Exploration Co., Inc.'s No. 1 William J. Richardson, C NE NE section 3-12n-7w, Belvidere Township, Montcalm County, however, was the 35-foot thickness of the Michigan Stray sands uncovered because the well was started as a Dundee oil test. Because it was drilled fully three times the usual depth into the shallow gas sands from which most of Michigan's commercial gas is being produced, it was recognized a complete upward revision of the state's gas reserves should be made.

The Bureau of Mines survey last year based its estimates of reserves on a thickness of 6½ feet of pay sand, the average in the Broomfield Township, Isabella County pool. Since then an open flow capacity of nearly 300,000,000 feet a day has been developed in the Millbrook-Hinton-Belvidere Townships pool of Mecosta and Montcalm Counties making it the largest gas field in the state and resulting in serious consideration by several corporations of investing more than $1,000,000 in new gas pipe lines to serve either Grand Rapids or Lansing and many smaller surrounding communities.

The new record well, exceeding Taggart Brothers' 34,000,000-foot well in the Austin Township, Mecosta County field, topped the Michigan Stray sands at 1,215 feet after encountering an estimated flow of 200,000 feet a day in shale at 1,204 feet. At 1,223 feet, or 8 feet in, about the usual depth to which such wells have been drilled in this section, the Richardson well had an open flow of about 7,000,000 feet a day. But the drillers continued with their 8-inch hole for they were on the way to test the Dundee limestone for oil.

At 1,247 feet, or 32 feet in the Michigan Stray sands, the well gauged about 35,300,000 feet potential and the flow continued to increase until a total depth of 1,250 feet, or 35 feet in the pay, was reached, where its open flow was estimated at 40,000,000 feet a day or more.

Despite the record flow drillers were ordered to cement off the gas and continue for Dundee oil as the hole had been located 330 feet instead of 660 feet from property lines of the lease and would have been credited with an open flow of only 20,000,000 feet.

John Borden, president of the Old Dutch Refining Co., of Muskegon, who is primarily interested in developing a supply of crude for the refinery, Wallace Pardoe, managing director of the company, and Leslie T. Barber, of Edmore, are associated in the enterprise. They hold a block of more than 3,200 acres around the Richardson lease. If the test is unsuccessful in the Dundee, it is planned to make a new location in the center of the 40-acre tract and drill it for gas.

The test indicates central Michigan gas reserves should be estimated from 30 to 60 per cent larger than heretofore. Several projects, including a proposed $400,000 line to Lansing on which the Consumers Power Co. has filed an application, are expected to be affected by the new discovery.

Other Gas Tests

While the Richardson well was registering its notable success, two other tests in the Hinton Township section of the field failed to strike commercial production in the Michigan Stray gas or Dundee oil sands. Fletcher & Leman's No. 1 Henry Grewe, C SE SE section 24-13n-8w, Hinton Township, struck water at 1,325 feet, only two locations north and one east of a 10,000,000-foot gas well. Columbia Oil & Gas Co.'s No. 1 Bale estate, C NW NE section 31, same township, topped the Dundee at 3,457 feet and was a "duster" 42 feet in, or at 3,499 feet. It also was dry in the Michigan Stray gas sands on the way to the oil formation. The Columbia company was completing another test in section 25, No. 1 R. L. Stebbins, C NE SE.

Gordon Oil Co. was completing two Millbrook Township gas tests, No. 1 Mary Dibean, C NW SW section 30, and with Edward Stewart's No. 3 Garner Brothers, C SE SW section 32, cased at 1,254 feet. Three other tests were nearing completion: Wiser Oil Co.'s No. 1 Peter Hough, C NE NW section 31, cased at 1,280 feet; No. 1 Garner & Wilson, C SW NW section 34, and Frank McCollister's No. 1-A Byron Yeomans, C SW SW section 35, which had been cemented and shut in awaiting orders to drill in.

Crude Records

The first week in November 10 fields produced 55,654 bbls. a day, or 692 bbls. more than the previous record of 54,962 bbls. during the week ended October 12.

The fields averaged as follows: Montcalm-Crystal, 24,195 bbls., a new high; Porter-Yost, 22,909 bbls.; Chippewa-Greendale, 3,133 bbls.; Ogemaw, 2,332 bbls.; Vernon-Leaton, 2,006 bbls.; Montcalm-Home, 302 bbls.; Saginaw-Birch Run, 251 bbls.; Muskegon-Oceana (western Michigan), 243 bbls.; Beaverton, 203 bbls., and the new Richland Township well in Saginaw County near Hemlock, 80 bbls.

November Estimates

The Michigan oil producers committee schedule of the number of wells, their pressure production by fields and estimated average daily runs or allowable as of November 1 revealed new high levels. The committee announced a total of 1,111 producers with an aggregate pressure production potential of 64,951 bbls. a day and estimated daily runs of 59,042 bbls.

Crystal-Montcalm had 65 wells with a pressure production of 33,442 bbls. a day and an allowable of 27,533 bbls. as the only field still prorated in Michigan. All other fields are permitted to produce 100 per cent of their pressure production as follows: Porter, 329 wells making 20,166 bbls.; Greendale-Chippewa, 298 wells making 3,197 bbls.; Yost pool, 23 wells making 2,728 bbls.; Ogemaw, 84 wells making 2,332 bbls.; Vernon-Leaton, 85 wells rated at 2,007 bbls.; Home-Montcalm, 6 wells for 302 bbls.; Muskegon-Oceana, 123 wells for 243 bbls.; Beaverton, 3 wells making 203 bbls. daily; Birch Run Township, Saginaw County, 16 wells good for 173 bbls. a day; the new Hemlock well making 80 bbls. a day, and 78 wells in the old Saginaw field rated at 1 bbl. each per day, or 78 bbls.

Completions

The Crystal-Montcalm, Greendale and Jasper Townships in Midland County, and Denver Township, Isabella County, shared the comparatively small new completion total of less than 1,000 bbls. of new daily potential developed last week in five wells.

Although Strange & Fortney's No. 1 Harvey and Inez Fisher, NW NW NE section 2-10n-5w, was the only Dundee completion in the Crystal-Ferris Townships area in Montcalm County, four other tests already had drilled into the pay sands with prospects of completion as commercial wells of small initials. The Fisher well, drilled to 3,191 feet, came in making 24 bbls. an hour and was given a rating of 257 bbls. a day.

Stork Oil Co.'s No. 4 George Dickenson, NE NW SE section 3, Crystal, was shut down at 3,186 feet with about 1,600 feet of oil but some water in the hole. It was cased at 3,169 feet.

Ferris-Montcalm

Two Ferris Township tests in Montcalm County already had drilled into the Dundee oil pay sands with prospects of success. W. J. Bernier was swabbing his No. 2 William Strait, SE NW SW section 35-11n-5w, which topped the Dundee at 3,194 feet, struck oil and gas at 3,196 feet and was completed at 3,197 feet with about 1,000 feet of oil in the hole. It was estimated good for 50 to 75 bbls. a day.

Morris-Barnes Oil & Gas Syndicate's No. 3 Pugsley, SE NE SW section 26, was running tubing to pump after filling about 1,600 feet with oil. The drill first struck the Dundee limestone at 3,261 feet and the pay sands 1 foot in where drilling operations were suspended.

Rex Oil & Gas Co. struck a flow of about 2,000,000 feet of gas in the Michigan Stray sands in the No. 1 R. & C. Ball, NE SE SE section 2, but cemented it off to drill on to the Dundee for oil.

Montcalm Wildcats

Completion of Jetter and Lima Oil companies' No. 1 C. N. Long, SW NW SE section 1-9n-6w, a Bushnell Township wildcat in Montcalm County, was delayed last week when the casing collapsed after a show of gas was encountered at 3,099 feet in the top of the Dundee. Operators will pull pipe and recase the hole.

Rex Oil & Gas Co. cased the No. 1 Sanford Newland, NW NW NW section 2-12n-3w, a Cato Township, Montcalm County, wildcat at 3,303 feet and was preparing to drill into the Dundee after a good show in the upper Traverse.

Gratiot County

In New Haven Township, Gratiot County, Crystal Oil & Gas Co., after casing its No. 1-B R. B. Shaver, C NW NE section 4-10n-4w, at 941 feet, struck a flow of about 3,000,000 feet of gas in the Michigan Stray sands.

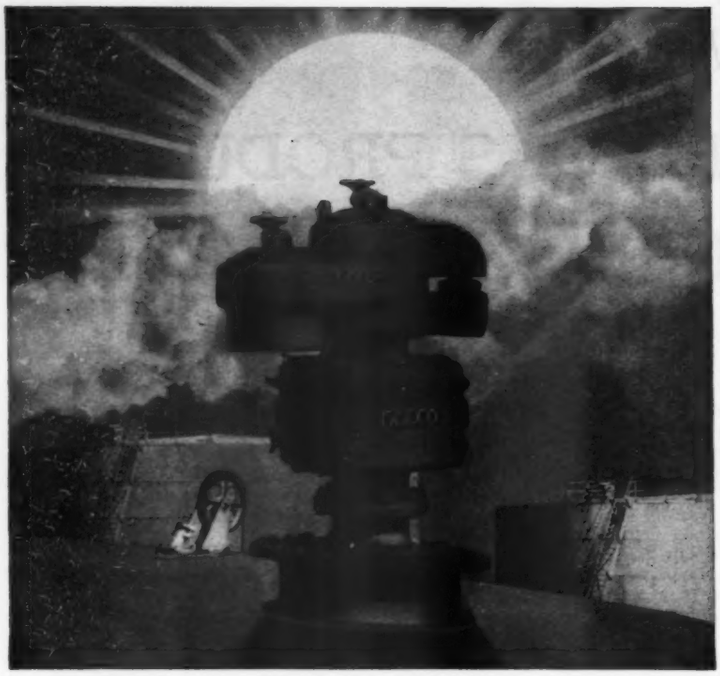
Midland County

Pure Oil Co. completed two 125-bbl. natural wells in the Greendale and Jasper Townships, respectively, of Midland County. No. 2 Yats, C N SW SE section 35-14n-2w, Greendale Township, was completed at 3,439 feet and will not be treated. No. 1-D Laura E. Root, C S SE SE section 2-13n-2w, Jasper Township, was completed at 3,441 feet and will be treated. No. 3 State-Porter, SE NE SE section 15-13n-1w, Porter Township, had a hole full of oil at 3,378 feet.

Midland Wildcats

W. Hunter Atha completed his third unsuccessful offset to the lone Mount Haley Township, Midland County producer. The latest failure was No. 1 August and Eltha Miller, C N NE SE section 28-13n-1e, which topped the Dundee at 3,453 feet after three shows at 3,001, 3,180 and 3,482 feet but was dry at 3,530 feet. It will be plugged and abandoned although the show at 3,180 feet was reported to have filled up 2,000 feet in the hole.

K. K. Liebrand's No. 1 State of Michigan well, also known as Riverside Oil & Gas Co.'s well, continued swabbing from 50 to 75 bbls. as a possible discovery well of a new pool in Larkin Township, Midland County, about 3 miles north of Midland. Located C NE NE section 32-15n-2e, it is producing the highest grade Michigan crude from the Berea at



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2,497 feet. It may be drilled to the Traverse or Dundee.

Isabella County

Two new Dundee producers added about 400 bbls. initial in Denver Township, Isabella County. T. T. Hawksworth's No. 1 Dimon, NW SW NW section 34-15n-3w, flowed 60 bbls. the first hour after treatment. Dundee was encountered at 3,542 feet and pay sands topped at 3,581 feet. It had an estimated initial of 250 bbls. Morris Oil & Gas Corp.'s No. 2 P. J. and Josephine Marthey, NE NW SE Section 19, same township, was rated a 150-bbl. initial producer in the Dundee at 3,659 feet, 44 feet in the Dundee. Chartiers Oil Co.'s No. 1 John West, SE SE SE section 12-15n-4w, Isabella Township, topped the Dundee at 3,656 feet and finished drilling at 3,709 feet for an initial of 5 bbls. natural. It filled only 100 feet in 12 hours but was to be treated. O. H. O'Neal's No. 1 John Y. Border, C SE SE section 31-16n-4w, Vernon Township, a gas test, was a dry hole in the Michigan Stray sands at 1,519 feet.

Ogemaw County

One dry hole, four wells testing possible commercial pay in the Traverse formation and one being completed in the Dundee comprised the completions or near completions in Ogemaw County.

An interesting outpost test in Cummings Township proved a disappointment when Goll, Graves & Mechling's No. 1 Dr. William Kerr, SW SW SE section 27-23n-3e, was dry in the Dundee. The lower formation was encountered at 2,820 feet and the hole drilled to about 3,000 feet.

Two offsets to Fortney Oil Co.'s Big State B-1 well, which has produced more than 75,000 bbls. from the lower Traverse in four weeks, were a disappointment. Melling Oil & Gas Co. is still trying to make a producer of No. 2 L. Roma, east offset, SW NW NW section 6-21n-3e, Mills Township. It came in for 10 bbls. an hour natural in the lower Traverse at 1,810 feet but quickly declined. Sun Oil Co.'s No. 1 State, NE SE NE section 1-21n-2e, Horton Township, south offset to the big Horton well, made two small flows from the lower Traverse at 1,811 feet after topping the Traverse at 1,682 feet but also struck water and probably will be deepened to the Dundee.

Weber Oil Co.'s No. 2 Boeing estate, SE SW SE section 36-22n-2e, West Branch Township, several locations to the northwest, struck a flow in the Traverse and was swabbing. Charlotte G. Marsh, trustee's No. 1 State, NW NE SW section 6, Mills Township, also was testing a Traverse show at 1,870 feet.

The one new Dundee producer in the Ogemaw field was Redman Oil Co.'s No. 2 Wobig heirs, NE NW SE section 6, Mills Township. It came in after drilling from 2,463 feet, the top of the limestone, to 2,614 feet and was placed on the swab.

Wildcats

Two wildcats were abandoned as dry, one in Genesee County, and the other in Allegan County. Smith Petroleum Co. abandoned No. 1 Anna Torrey, NW NW NE section 5-9n-8e, Forest Township, Genesee County, after failure in the Berea. Heath Oil Co.'s No. 1 H. Terpstra, NE NW SE section 34-3n-14w, Heath Township, Allegan County, was plugged after testing the Traverse, Dundee and Monroe to a depth of 2,121 feet.

M. C. Fordyce's No. 1 Mike Suszko, SE SE NE section 11-18n-3e, Gibson Township, Bay County, was plugging back to the Traverse to test shows from 2,030 to 2,070 feet after failure in the Dundee to a total depth of 2,987 feet where water was encountered.

New Tests

Plans for drilling a fifth Ionia wildcat were revealed when H. C. James filed a lease on 337 acres comprising the Stephen Kimball farm east of Lyons. Henry McEvoy of St. Louis, Mich., was to start building rig this week.

A new Lake County test is being started by Frank Lyons on the J. J. Alderson lease, NW SE SE section 33-17n-13w, Pleasant Plains Township.

Committee Is Named as Hosts for Expo.

"Oil men from every petroleum section in the country as well as those from the 15 to 25 foreign countries who usually participate will find the oil capital of the world a real host when they come to the International Petroleum Exposition in Tulsa next May 16 to 23," according to W. G. Skelly, president of the exposition.

A local committee whose duties will be to see that visitors are given every hospitality was organized last week at a banquet at which J. Edgar Pew, vice president of the Sun Oil Co. of Philadelphia, and a director of the exposition, was invited as honor guest. Frank Hugill, of the First National Bank of Tulsa, is chairman of the committee.

Hosts for the various days during the exposition named by the commit-

Lu Tidd, treasurer of Black, Sivalls & Bryson, Inc., Oklahoma City, has had plenty of experience in the oil and supply business, having worked with oil companies and also been vice president of a large supply company for which he opened an office and warehouse in Rumania

tee are: Opening Saturday, May 10, W. G. Skelly, president of Skelly Oil Co:; Sunday, R. W. McDowell, Mid-Continent Petroleum Corp.; Monday, George S. Rollin, Shell Petroleum Corp.; Tuesday, Ralph Dietler, Stanolind Oil Co.; Wednesday, R. B. Pringle, Tide Water Oil Co.; Thursday, A. O. Olson, Olson Drilling Co.; W. R. Francisco, Deep Rock Oil Corp., and E. B. Reeser, Barnsdall Oil Corp.

Strike Matches on Grit From the Crankcase

To show impressively that harmful abrasives accumulate in motor oil in the course of a thousand miles of driving Standard Oil Co. (Indiana) is distributing to customers millions of packets of matches whose friction strips were made from abrasives taken from oil drains. These match packet friction strips are evidence of facts learned by engineers who analyzed the drains from 700 different cars of various makes and ages which had been using many different makes and grades of oil.

The tests revealed there is an accumulation of enough harmful abrasives in the average 1,000-mile, 6-quart crankcase drain to make the friction strips for 2,300 packets of matches, the actual quantity being .49 cubic inches. These abrasives, mostly sand and metal particles, were extracted exclusively from the oil drained, and were not obtained by scraping or flushing crankcases. How harmful they apparently are to the interior walls of engine cylinders may be judged from the fact that they will scratch plate glass.

Central West

Operations in Central Ohio, Kentucky, Illinois, Indiana

By GEORGE A. WHITNEY

FINDLAY, Ohio, Nov. 11.—In Lorain County, central Ohio field, Ohio Fuel Gas Co.'s No. 1 on the Fred D. Smith farm, section 26, Lagrange Township, was dry at 2,371 feet, but will be drilled deeper.

In Ashland County, Ohio Fuel Gas Co. is drilling No. 1 Irene Stackhouse, section 10, Orange Township. Moore and others' No. 9 on the George W. Black farm, section 34, Mohican Township, produced 15 bbls. Ohio Fuel Gas Co. has rig up for No. 1 William Lee Hammett, section 16, Vermillion Township.

In Stark County, East Ohio Gas Co.'s No. 1 J. and E. Holtzbach, section 4, Jackson Township, is a gas well at 4,342 feet.

INDIANA

In Martin County, Indiana, George E. Nelson & Co. is drilling No. 2 E. D. and E. S. Darnell, section 25, Perry Township. Trinity Oil Co.'s No. 2 on the Thompson heirs farm, section 17, Mitchell Tree Township, was dry at 1,580 feet.

In Jay County, Penn-Jay Oil Co.'s No. 1 Marion Kelley, NE NE section 25, Penn Township, came in with an initial of 15 bbls. at 1,064 feet.

In Vigo County, Siosi Oil Co. drilled a dry hole in No. 1 Nora E. Jones, SW SW section 6, Linton Township, at 2,169 feet.

In Lawrence County, A. B. Bement drilled a dry hole on the A. Murphy farm, SE SW SE section 17, Bono Township, Lawrence County.

In Henry County, Cecil Morris-Knightstown Natural Gas Co.'s No. 3 was a gas well at 1,007 feet. No. 4, section 12, was a gas well at 990 feet.

In Dubois County, F. L. Damron's No. 2 John Eck, SW SW section 32, Harbison Township, was dry.

In Harrison County, Joseph's No. 4 Sid Elberts, section 8, was dry at 165 feet.

KENTUCKY

In Hancock County, Kentucky, Joseph B. Mayers' No. 1 Josh Ellenwood, in the Livermore area, produced an initial of 220 bbls. F. E. Patton's No. 1 Shockley Brothers, in McLean County, was dry.

In Ohio County, Sunflower Oil Co.'s No. 8 Sally Jones, in the Oak Station area, produced an initial of 85 bbls. Teller & Co.'s No. 5 Orville Whitehouse, in the Webster pool, produced 25 bbls. Egg Oil Co.'s No. 1 Alfred Brown, in the Deanfield pool, was dry. Lowe & Co. found a dry hole in No. 1 Neeley Legran. Marietta Oil Co.'s No. 2 T. Escridge produced 4 bbls.

Canadian Foothills

CHATHAM, Ontario, Nov. 9.—In the Forest Reserve area to the west of Olds, Hunter Valley Oil Co.'s No. 1 McLaren, LSD 12, section 13-31-10w5, is below 5,222 feet.

On the Moose dome west of Calgary, Moose Oils' No. 2, LSD 8, section 29-22-6w5, is below 310 feet.

On the Aldersyde structure, Ranchmen's Gas & Oil Co.'s No. 1, LSD 16, section 13-20-28w4, has resumed from 6,532 feet. Two additional oil shows were met and there is considerable crude in the hole. It is the deepest well in Canada outside Turner Valley.

On the Highwood-Sinclair structure Maple Leaf Royalties' No. 1 Banner, LSD 6, section 34-17-3w5, is below 2,560 feet and piping gas to the camp.

On the Watson structure north and west of Lundbreck, Mar Jon Oil Co.'s No. 3, LSD 3, section 4-10-2w5, is shut down at 3,490 feet owing to weather, about 500 feet in the Blairmore.

In the Pincher Creek area, Weymarn Petroleum's No. 2, LSD 5, section 7-6-1w5, is waiting for fuel oil to resume from 3,900 feet.

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IMPORTANT MANUFACTURERS of finishes for the petroleum industry today are employing Bakelite Synthetic Resins in more and more of their formulations. The reason can be found in the results of thorough studies conducted by these manufacturers' own technologists. In the course of continuous research to find paint methods and materials that will afford greater protection over longer periods, they have discovered and recognized the advantages of Bakelite Resins.

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SYNTHETIC RESINS

Eastern Field Report

By STAFF CORRESPONDENT

ORISKANY GAS COMPLETION IN KANAWHA DISTRICT, W.VA.

PITTSBURGH, Pa., Nov. 11.—Another good Oriskany gas well was completed in Malden district, Kanawha County, West Virginia. South Penn Oil Co. completed its test on the Katherine C. Scott farm at 4,619 feet and from the natural volume it is probably the largest Oriskany sand gas well completed in the state. Top of the Corniferous lime was at 4,520 feet with top of the Oriskany at 4,610 feet. Its volume is about 3,000,000 feet a day, natural.

This test is on Spring Fork of Campbells Creek, about 1 mile from Campbells Creek and about 2,500 feet east, slightly north, of Godfrey L. Cabot, Inc.'s No. 8 on the Campbells Creek Coal Co. lease. As usual in this section, the gas pay was found in the top of the Oriskany sand which was not drilled through due to the gas pressure. Neither was the well shot on account of the difficulty of placing one against the pressure.

South Penn Oil Co. has made a location for a second test on the northeast corner of the farm about 1,200 feet south of Columbian Carbon Co.'s No. 14 on the W. D. Lewis farm, which is also a heavy gas well. The Katherine C. Scott farm is about 1,000 acres and on older maps appears as the J. B. Lewis estate.

There were 24 completions and five dry holes in the lower Eastern fields during the week. Ten were gas wells and 14 producers with an initial production of 102 bbls. Southeast Ohio led in completions and new production.

South Penn Oil Co. has purchased the Heck Oil Co. of West Virginia which operated chiefly in Roane County, West Virginia. Heck Oil Co. owned over 4,000 acres of leases on which there were 101 producing wells and 11 gas wells. A. S. Heck of Spencer, W. Va., was the principal owner.

SOUTHEAST OHIO

The largest well in Southeast Ohio during the week was Pure Oil Co.'s No. 5 on the A. B. Swingle farm, NW section 3, Brish Creek Township. It was drilled in the Clinton sand at 4,170 feet and has 2,000,000 feet of gas a day.

In Athens County, Carpenter & Glazier completed No. 7 on the John Smith farm, 2 miles south of Amesville, section 13, Ames Township. It is a shallow Cow Run sand well at 316 feet and is showing for a 4-bbl. producer. Near Jerseyville in section 35, Lodi Township, Lima Gas Corp. drilled No. 3 on the Russell E. Wilson farm through the Grit to 1,524 feet. It was dry.

In Belmont County, Union Gasoline & Oil Corp. completed a test on the Albert Sneico farm in section 26, Richland Township, in the Berea sand at 1,935 feet. It produced 25 bbls. the first day after shot.

In Guernsey County, Barry Rich Oil Co. completed a test on the Mary Secrest farm, SW section 19, Seneca Township. It will make a half-barrel pumper in the Berea grit at 1,530 feet. In the SW section 18, Ferguson & McCullough completed a similar well on the Frank Rich farm in the same formation at 1,400 feet.

In Holmes County, S. J. Bell and others completed a test on the Ross E. Conrad farm, section 18, Mechanic Township, in the Berea sand at 808 feet. It is a gas well gauging 70,000 feet a day with no showing of oil.

In Medina County, Curtis & Eaken completed No. 13 on the Thomas Brown, Jr., Tract 6, Lot 22, Chatham Township, in the Berea grit at 382 feet. It produced 2 bbls. the first day after shot. In Tract 10, Lot 3, Oko Oil & Gas Co. completed No. 41 on the Sanford and Watson lease in the Berea grit at 373 feet, good for 1 bbl. the first day after shot. On Tract 15, Lot 12, E. R. Edson & Son Co. completed No. 68 on the Ed G. Miller farm at 515 feet, the Berea grit, and it produced 5 bbls. the first day after shot. On Tract 16, Lot 2, these operators drilled No. 44 on the M. A. and Eva Franks farm through the Berea grit to 515 feet and it was dry.

In Morgan County, Leland Burt and others completed No. 3 on the F. H. Tuttle farm 1 mile north of Dale, Lot 1,097, Windsor Township. It was drilled in the Peeker sand at 469 feet and will make about 1 bbl. a day.

In Monroe County, Hines Brothers and others completed a second test on the N. L. Hines farm in section 32, Franklin Township, in the Cow Run sand at 790 feet. It produced 2 bbls. the first day, natural. In the SW section 16, Franklin Township, Robinson & Greene completed a second test on the N. M. Leasure farm in the Salt sand at 1,005 feet. It is a light gas well gauging 25,000 feet a day. In section 16, Perry Township, Frank E. Young drilled on the S. E. Cline farm through the Warren sand to 3,200 feet. It was dry.

In Perry County, Thistle Oil Co. completed No. 9 on the Carlos C. Stotler farm, SE section 28, Monroe Township, in the Berea sand at 1,089 feet. It produced 7 bbls. the first day after shot.

In Washington County, George Pickens and others completed No. 12 on the Alvin Adkins farm, NW section 27, Newport Township, in the First Cow Run sand at 422 feet. It produced a half barrel the first day, natural, which increased to 3 bbls. a day after shot.

WEST VIRGINIA

Two producers were completed in West Virginia. In Gilmer County, Hope Construction & Refining Co. deepened the test on the K. C. Simmons farm in Center district to 3,572 feet. It is producing about 20 bbls. a day in the slate below the Berea.

In Wirt County, Glen Roberts and others completed No. 5 on the G. W. Roberts estate in Burnings Springs district in the Injun sand at 1,964 feet, showing for 5 bbls. a day.

Gas Wells

In Boone County, Pond Fork Oil & Gas Co. completed No. 22 on the Cole and Crane lease in Washington district in the Brown shale at 3,450 feet. It is a gas well gauging 648,000 feet a day.

In Gilmer County, West Virginia Utilities Co. completed No. 5 on the John J. Gerwig farm in Center district in the Injun sand at 2,084 feet. It will make a gas well.

In Monongalia County, Carnegie Natural Gas Co., drilling the test on the Elmus L. Brand farm in Cass district, was forced to shut down on account of an unexpected volume of gas in the Murphy sand at 676 feet, or 268 feet below the Pittsburgh Coal. The volume was 600,000 feet a day, which blew down to 400,000 feet.

In Ritchie County, W. H. Bickel completed a test on the Henry Miller farm in Murphy district in the Gas sand at 1,554 feet. It is a good gas well gauging 2,500,000 feet a day. On Lambs Run King Knob Oil & Gas Co. drilled No. 6 on the Peyton Lingler farm through the Big Injun sand and it was dry.

In Roane County, Lowther & Vandale completed a test on the Charles McMillen farm in Smithfield district at 1,884 feet. The Big Lime was at 1,734-1,855 feet; gas, 1,738-40 feet; Keener sand, 1,853-56 feet; Big Injun sand, 1,856-70 feet. The volume of gas was 116,000 feet, natural.

Deep Tests

In Loudin district, Kanawha County, Godfrey L. Cabot, Inc., is nearing the Oriskany sand on the A. F. Vorholt farm at 4,805 feet. This operator's second test on the Kanawha Land Co. lease has reached 991 feet. Columbian Carbon Co. is drilling at 1,150 feet on the S. H. Hoge farm.

In Union district, Godfrey L. Cabot, Inc., is drilling at 2,457 feet on the Alberta Putney farm. In Jefferson district, Kanawha County, Benedum & Trees have shut down cementing at 6,240 feet. Top of the Clinton sand was at 6,130 feet.

In Elk district, Kanawha County, this company is drilling at 2,620 feet in No. 2 on the G. and D. Copenhaver farm, and the test on the W. L. Burdette farm is at 1,617 feet.

In Malden district, Kanawha County, Godfrey L. Cabot, Inc., has reached 1,675 feet on the W. D. Lewis farm and 885 feet in No. 9 on the Campbells Creek Coal Co. Columbian Carbon Co. is down 1,230 feet on the M. J. Dearing heirs farm.

In Cabell County, Toms Creek Gas Co. has reached 3,635 feet on the C. W. Meelingh farm in McComas district. United Fuel Gas Co. is down 960 feet on the Walter Ray farm. Martin & Swanson have reached 3,017 feet on the Henry Childers test. R. H. Adkins and others are down 1,600 feet on the R. L. Johnson farm. In Union district, Sureshot Torpedo Co. is down 1,122 feet on its own property.

Other Operations

In Calhoun County, F. F. McIntosh has made a location on the Charles Poling farm in Sherman district. H. B. Scott has made a location on the L. M. Pitts farm, same district. In Sheridan district, A. Rothwell is drilling on the J. M. Basnett and others lease and has reached 1,750 feet. In Lee district, four wells are drilling. H. S. Adams and others are down 1,750 feet in No. 2 on the Ruby Smith farm; Simmons Gas Co. has reached 1,934 feet in No. 3 on the Sylvester Brannon farm; Kingsbury & Dallman are drilling at 930 feet on the Homer and Lizzie Lynch farm, No. 2; McCall Drilling Co. is at 750 feet on the D. R. Kirby test. In Washington district, K. M. Hunt and others are drilling at 1,300 feet on the Vivietta Brannon farm. Big Four Drilling Co. is rigging up on the Henry Wallbrown farm. Mudlick Oil & Gas Co. is down 950 feet in No. 3 on the I. G. Flesher farm.

In Fayette County, Godfrey, L. Cabot, Inc., is drilling at 1,925 feet in No. 6 on the Kanawha Gas, Coal & Coke Co. lease in Falls district.

In Lincoln County, G. L. Maebon is drilling deeper No. 2 on the E. W. Fry farm in Laurel Hill district. The depth is 3,000 feet.

In Marshall County, B. L. Frye is drilling at 2,990 feet on the F. R. Dorman farm in Webster district. In Raleigh County, Godfrey L. Cabot, Inc., has part of the material on the ground for No. 10 on the Beaver Coal Co. lease in Slab Fork district.

In Ritchie County, C. H. Rockwell and others are moving a machine for No. 3 on the W. C. Butchue farm in Clay district. Busch Brothers are rigging up on the Mahala Tingler farm.

In Roane County, H. H. Staats and others are drilling on the L. E. Bolte farm in Spencer district 20 feet west of Tanner Run. In Curtis district, F. F. McIntosh is rigging up for No. 3 on the McIntosh and Norman farm. In Geary district, Jackson & Bowers are drilling on the Aaron White farm at 450 feet.

In Wetzel County, C. B. Lewis has rigged up on the John Blatt farm in Proctor district. Manufacturers Light & Heat Co. is drilling the Thelma Allen test at 300 feet and is rigged up on the George Foland farm. Smith & Eagan are down 300 feet on the Sampson Wood farm and Columbian

Carbon Co. 800 feet on the N. C. Adams farm.

SOUTHWEST PENNSYLVANIA

There was one fair producer, one gas well, and a dry hole added in Southwest Pennsylvania. In Amwell Township, Washington County, F. K. Fawcett and others completed the test on the William A. Dodd farm at 2,992 feet. Top of the Fifth sand was at 2,972 feet, with oil showing at 2,987 feet, which, over the Sunday shutdown, filled up the hole. It is estimated good for 35 bbls. a day.

In South Franklin Township, Washington County, E. H. and J. B. Tague completed the second test on the Hiram McClain farm at 1,339 feet. The Dunkard sand was dry and top of the Gas sand was reached at 1,300 feet with about 150,000 feet of gas at 1,318-38 feet.

In Greene County, Rutan Oil Co. drilled No. 3 on the C. T. Harvey farm in Center district through the Niniveh Thirty-foot sand to 3,266 feet. It was dry.

In Allegheny County, E. A. Bream & Co. are drilling on the James Coyne farm in Hampton Township and have reached 1,500 feet. In this township, Oliver Miller has a rig standing on the Hancock heirs farm.

In Greene County, J. I. Eddy & Co. have started drilling on the J. G. Fordyce farm in Gilmore Township. In Richhill Township, Lewis & Co. reached 500 feet on the Samuel Chess farm and shut down for a fishing job.

In Morris Township, Greene County, Carnegie Natural Gas Co. is drilling at 2,605 feet on the Lucinda Hunt farm. In Aleppo Township, G. B. Patterson has reached 2,675 feet in No. 3 on the John S. Wise farm.

In Richhill Township, Wasmuth & Callahan have reached 2,360 feet in No. 3 on the Goodwin heirs farm. David Braddock is down 1,590 feet in No. 8 on the Newton Braddock farm on Crabapple Run.

In Washington County, Parkinson & Dague have made a location on the Chris Ealy farm in East Findley Township. In South Franklin Township, Carnegie Natural Gas Co. is drilling on the J. Dodd farm at 510 feet.

In Amwell Township, Washington County, same company is drilling at 2,650 feet on the C. W. Dunn farm. Here Union Gasoline & Oil Corp. is down 2,375 feet on the Charles Vankirk farm. Moore, Orrill & Co. are drilling at 1,960 feet on the C. E. Hackney farm.

Deep Tests

In South Beaver Township, Beaver County, John Galey and others are still short of completion on the William Graham farm on Rush Run. They are again running tour to check further caving.

In South Shenango Township, Crawford County, Carnegie Natural Gas Co. ran 3,122 feet 6 inches of 6⅝-inch casing on the Gertrude Scott farm and resumed drilling below the Oriskany horizon. The present depth is 3,185 feet with some water in the hole.

INTERSTATE TRANSPORTATION AND EXPORTS OF NATURAL GAS IN 1934

State from which gas was transported	State to which gas was transported	M cubic feet
Colorado	Utah	1,772,000
	Wyoming	143,000
		1,915,000
Illinois	Indiana	4,000
Indiana	Illinois	3,000
	Kentucky	152,000
	Ohio	2,000
		157,000
Kansas	Colorado	286,000
	Illinois	2,019,000
	Indiana	703,000
	Iowa	5,617,000
	Minnesota	3,821,000
	Missouri	4,716,000
	Nebraska	6,323,000
	Oklahoma	488,000
	South Dakota	651,000
		24,424,000
Kentucky	Dist. of Colum.	1,827,000
	Illinois	111,000
	Indiana	512,000
	Maryland	524,000
	Ohio	5,030,000
	Pennsylvania	10,173,000
	Virginia	233,000
	West Virginia	6,188,000
		24,608,000
Louisiana	Alabama	7,457,000
	Arkansas	17,528,000
	Georgia	5,331,000
	Illinois	10,971,000
	Mississippi	2,618,000
	Missouri	9,274,000
	Tennessee	8,050,000
	Texas	32,117,000
		93,346,000
Mississippi	Alabama	475,000
	Florida	554,000
	Georgia	26,000
	Louisiana	2,589,000
		3,644,000
Missouri	Illinois	164,000
	Indiana	60,000
		224,000
Montana	North Dakota	1,112,000
	South Dakota	2,609,000
		3,721,000
New Mexico	Arizona	4,729,000
	Colorado	111,000
	Texas	4,184,000
		9,024,000
New York	Canada	24,000
	Pennsylvania	2,000
		26,000
Ohio	Indiana	765,000
	Kentucky	34,000
	West Virginia	263,000
		1,062,000
Oklahoma	Arkansas	523,000
	Kansas	10,413,000
	Missouri	2,880,000
	Nebraska	181,000
	Texas	1,334,000
		15,331,000
Pennsylvania	Canada	49,000
	Dist. of Colum.	451,000
	Maryland	128,000
	New York	24,957,000
	Ohio	653,000
	Virginia	15,000
	West Virginia	429,000
		26,682,000
Texas	Colorado	15,331,000
	Illinois	29,952,000
	Indiana	9,175,000
	Iowa	11,019,000
	Kansas	32,701,000
	Louisiana	2,457,000
	Mexico	5,728,000
	Minnesota	3,504,000
	Missouri	12,597,000
	Nebraska	5,473,000
	New Mexico	574,000
	Oklahoma	10,107,000
	South Dakota	630,000
	Wyoming	316,000
		139,564,000
West Virginia	Dist. of Colum.	352,000
	Kentucky	5,404,000
	Maryland	100,000
	Ohio	40,045,000
	Pennsylvania	17,743,000
	Virginia	44,000
		63,688,000
Wyoming	Colorado	2,000
	Montana	1,126,000
	Nebraska	512,000
	Utah	4,822,000
		6,762,000
		414,183,000

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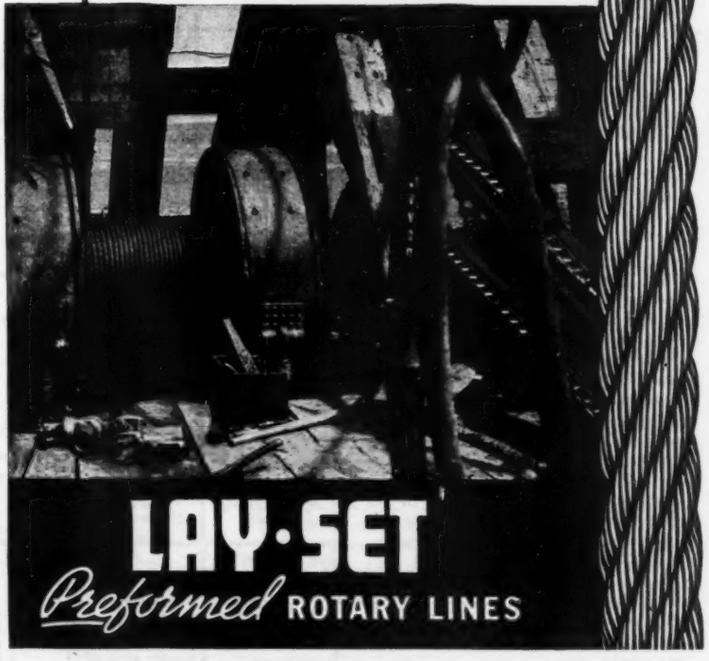

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North Louisiana, Arkansas

FIVE RODESSA COMPLETIONS; FOUR OIL AND ONE GAS WELL

By J. R. CRUMPTON

SHREVEPORT, La., Nov. 11.—The Rodessa field in the northwestern part of Caddo Parish had a good week from the completion standpoint with four oil wells and one gasser. The center of interest in that area, however, is still focused on Vaughn Production Co.'s No. 1 T. M. Comegys, 330 feet north and east of SW cor. SE SE section 10-23-16, an outpost test 1 mile north of production. Seven-inch casing was set at 5,906 feet and testing begun by washing from a total depth of 5,996 feet. After refusing to come in by this method, the well was blown with gas and later with an air jammer for a period of 12 hours. The later testing resulted in a good show of oil and gas with some drilling mud and at the present writing the crew is waiting for the well to come in of its own accord.

The operators think the hole is bottomed in the Dees sand or third producing gas sand in the area to the south, nearer the fault line. Other operators think the present depth is in the Gloyd sand, second gas producing horizon. The Hill sand, first gas pay on the updip nearer the fault line, was topped in this test at 5,745 feet. The well has all the earmarks of a producer of some sort from the present depth, but it is possible it could be deepened and the flow increased. This is a hazardous procedure, however, as the subsea bottom logs 5,780 feet or about 7 feet above the supposed water line. The water line may level off to the north, but the operators of the test are working on the theory that the upper gas sands nearer the fault line will be the oil sands on the northern flank and are taking no chances on contacting water by drilling to the saturated Oolitic lime which produces to the south. At any rate, the results so far assure an extension north of production and has caused a flurry of buying at high prices in a heretofore doubtful area.

The most persistent efforts to cut off water and complete as a pipe line producer yet demonstrated since the discovery of the Rodessa field was demonstrated by United Gas Public Service Co.'s No. 1 Rodessa Oil & Land Co. in the SE cor. section 15-23-16. After several efforts to cement off a 27 per cent water show from the original total depth of 6,046 feet, the hole was plugged back to the casing seat at 5,965 feet and cored out cement to 5,978 feet. The well was completed flowing 700 bbls. daily of pipe line oil through one-half inch choke on tubing with no water from this depth, and is a west offset to O'Brien Brothers' producer, which showed a small amount of water. Haynes Production Co.'s No. 2 Harry Otwell, 660 feet north and 230 feet east of SW cor. of section 14-23-16, was completed as one of the largest gushers in the field to date. The well had an initial flow of 600 bbls. per hour through 2-inch choke on casing from a total depth of 6,012 feet or subsea depth of 5,775 feet. Top of saturated lime was cored at 5,982 feet or 30 feet into the pay horizon to the bottom.

On 600 Bbl. Allowable

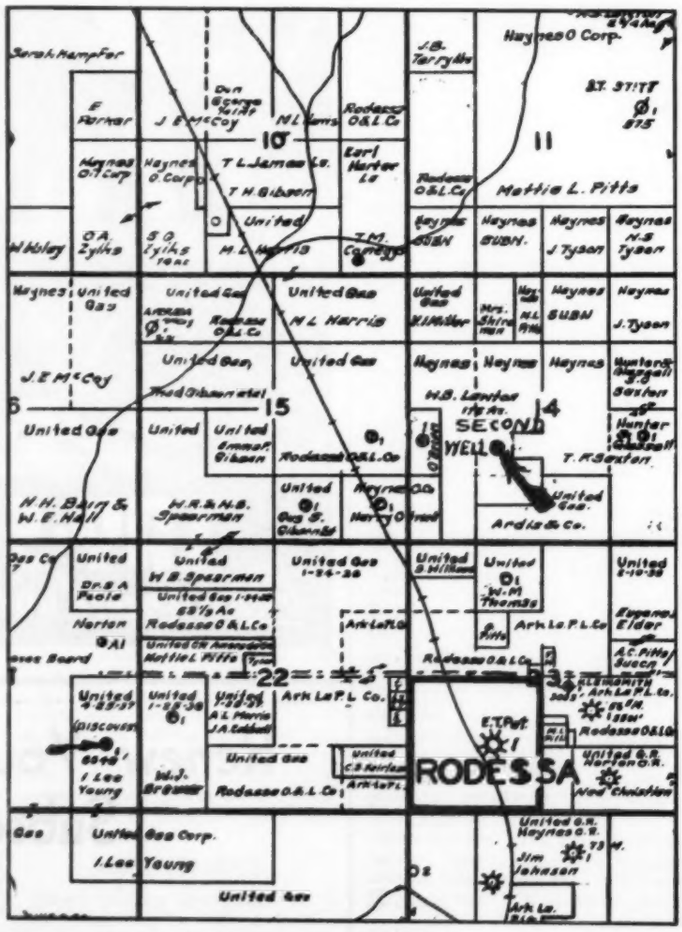
United Gas Public Service Co.'s No. 2 Rodessa Oil & Land Co., 660 feet south and west of NE cor. section 22-23-16, was deepened after flowing 20 bbls. per hour through one-half inch choke from 5,986 feet to 6,003 feet. The well gauged 1,215 bbls. in 13 hours and 500,000 feet of gas through one-half inch choke on tubing. Top of saturated lime was logged at 5,971 feet. It is an offset south of Haynes Production Co.'s No. 1 Otwell, the first well in the field to drill too deep into the water level. One-fourth of a mile to the south, Arkansas-Louisiana Pipe Line Co.'s No. 3 Rodessa Oil & Land Co., section 22-23-16, topped the saturated lime at 5,953 feet and was completed flowing 92 bbls. per hour through one-half inch choke on casing from a total depth of 6,000 feet.

All of the wells completed in Rodessa since November 1 have been put on the 600-bbl. allowable after cleaning themselves out. In the Rodessa townsite, Eastern Texas Production Co.'s No. 1 Caddo School Board, section 23-23-16, was completed with an estimated initial flow of 20,000,000 feet of saturated gas and 8 bbls. of distillate per hour from 6,032 feet. The well, true to predictions, is a little too far on the updip toward the fault line and the gas-producing area.

Interest will be centered during the next 10 days on four outpost tests southwest, north and northeast of production. R. W. Norton's No. 1 Fosque, section 20-23-16, 1 mile west of the discovery well, and one-half east of the Cass County line, topped massive anhydrites at 5,315 feet with the base at 5,580 feet. Top of Hill sand was logged at 5,712 feet and the test is drilling slightly below that depth. United Gas Public Service Co.'s No. 1 Thurman, John Coleman Survey, just inside the Cass County line and southwest of the gas area in the field, is making rapid progress, drilling in shale and lime at 4,970 feet. This test seems to be in the gas area, judging from the position of the nearest gas wells in Louisiana and the lone gasser to the north in Cass County.

One-fourth of a mile north of Vaughn Production Co.'s No. 1 Comegys, George Mannahan's No. 1 Comegys, section 10-23-16, will be more or less proven by the former test. The Mannahan well topped anhydrites at 5,125 feet and is drilling in lime and shale at 5,345 feet. Vaughn Production Co.'s No. 1 Hunter-Derryberry, section 14-23-16, one-half mile southeast of No. 1 Comegys and one-half mile north of production, seems practically certain of making a well as a result of the showing of the Comegys well. This test has set 7-inch at 5,900 feet with the total depth at 6,026 feet. Both wells check the same subsea bottom, 5,780 feet.

The farthest test northeast of production, about 1 mile northeast of Haynes Production Co.'s No. 1 Lawton, R. W. Norton's No. 1 Tyson heirs, section 13-23-16, should give information on potential production in that direction during the next week. Top of massive anhydrites was logged at 5,319 feet, base at 5,568 feet and the test is drilling in shale and lime at 5,681 feet. The result of these flank wells will have much to do with the drilling trend in the Rodessa area for the next few months. Bartex Pipe Line Co., a subsidiary of Phillips Petroleum Co., is rigging up to drill its No. 1 Norton estate, SE cor. NE section 18-23-15. This test is more than 2 miles north and east of the producing wells around the town of Rodessa.



Showing Vaughn Production Co.'s No. 1 Comegys, section 10-23-16

Claiborne Parish

Two hot wildcats to the upper Trinity in the Sugar Creek area of Claiborne Parish are nearing the anticipated pay horizon. About 7 miles northeast of the Oolitic lime gas field in the Lisbon area, E. T. Oakes' No. 1 H. W. Patton estate, section 1-20-5, topped anhydrites at 3,834 feet and is drilling in this formation at 4,132 feet. The base of anhydrites will give a more definite check on the test, but at its present stage it is being watched very closely as a possible gas or oil well from the Glen Rose. The test is about 3½ miles south of a deep test drilled about two years ago by United Gas and which has been making from 5 to 7 bbls. of oil since its abandonment.

Northwest of Sugar Creek, Ryan Oil Corp.'s No. 1 F. A. Gladney, section 27-20-7, topped the Nacatoch at 2,105 feet with the base at 2,635 feet,

logged top of red beds at 3,572 feet and is temporarily shut down in lime at 3,832 feet. This test is on a block of approximately 9,000 acres, has carried a good geological report for several years, and before present operations were started was surveyed as a geophysical high.

On the immediate flank of the Sugar Creek field, United Gas Public Service Co. is rigging up on its No. 2 Durrett in section 31-20-5, on what is reported to be a test for oil under the Oolitic lime gas. Standard Oil Co. of Louisiana and Triangle Drilling Co. of Shreveport each have a one-third working interest with United Gas in the present well and in the acreage covering the Sugar Creek field. Triangle Drilling Co. discovered Glen Rose production in this field as well as the Sligo field in Bossier Parish. In the latter area, this company has recently spudded its No. 3 Skannall, section 13-17-12, for an oil test to some of the lower producing horizons of the Trinity. Both of these areas, as well as the Cotton Valley and Shongaloo fields in the northern part of Webster, are looked upon as potential Trinity oil fields.

Other Operations

A Madison Parish wildcat, Southern Land & Exploration Co.'s No. 1 Delta Land Co., section 1-17-12e, has set 8⅝-inch casing at 2,106 feet to test a show of gas with the hole bottomed at 2,207 feet. Top of the Wilcox was logged at 2,183 feet. Amerada Petroleum Corp.'s deep test in Rapides Parish, No. 1 Weil, section 53-1s-2e, developed 39 joints of salt water on drill stem test from 6,718-34 feet and is drilling ahead. In the Many area of the Zwolle field, Sabine Parish, A. H. Tarver's No. 1 Baker, section 36-8-12, is cleaning hole to deepen from 4,127 feet. All previous deep tests in the Zwolle area, which produces from the chalk rock from 2,200 to 2,700 feet, have been failures, although encountering good shows at various depths. The present test is said to have logged higher structurally than any that were drilled below the chalk.

ARKANSAS

Wildcat drilling in Arkansas has been slow and uneventful during the past two weeks. Benedum & Trees' No. 1 Holmes, section 4-17-5, Ashley County, has made several dry drill stem tests in the Nacatoch and lower formations. The test is drilling in hard lime at 3,766 feet. A deep test southeast of the Bradley field in Lafayette County, Joe Modisett's No. 1 Red River Lumber Co., section 21-19-24, has made good progress and is drilling in hard shale and streaks of lime at 4,890 feet. There is no information at this writing on contact of anhydrites or how the well is checking in comparison with Rodessa to the southwest. In the same county, Transportation Petroleum Co.'s No. 1 Cockran, section 26-19-25, is reported to have had a show of oil at 3,344 feet and is shut down waiting orders. Southeast of the Miller County field, King Oil Corp.'s No. 1 G. W. Crank, section 19-16-25, is coring lime and shale at 3,073 feet. C. V. Lenz' No. 1 Dean, section 24-15-26, in the Garland City area, cored sand with a show of oil from 2,625-35 feet, but did not test and is coring at 2,830 feet.

In Ouachita County, Benedum & Trees' No. 1 H. Brighton, section 29-14-19, developed 22 fourbles of salt water on drill stem test from 3,770 to 3,800 feet and is deepening. Top of the Blossom was logged at 2,063 feet and top of red beds at 2,484 feet. In the vicinity of a lone producing wildcat from shallow Nacatoch about 6 miles west of the town of Camden, W. B. Street, trustee's No. 1 Rath & Cartier, section 35-13-18, has set 12-inch surface at 42 feet.

Two completions were reported, both dry. An Ashley County wildcat, Texas Seaboard Oil Co.'s No. 1 Bynum Cooperage Co., section 34-17s-4w, was abandoned as dry in hard rock at 2,465 feet. C. W. Hayes' No. 1 State, section 31-15-25, Miller County, encountered salt water and was abandoned at 3,010 feet.

East Texas Border Counties

Six miles southwest of nearest gas production of the Rodessa field, in Cass County, American Liberty Oil Co.'s No. 1 J. B. Rodgers, C. M. Robinson Survey, has set 16-inch surface casing at 200 feet and is drilling at 1,000 feet. The test is supposed to be on the Rodessa trend. In the Hughes Springs area of Cass County, Stanley A. Thompson's No. 1 Hubbard, William King Survey, was coring at 3,981 feet in the Woodbine horizon with no show of oil or gas. It is reported checking 113 feet lower than a previous test in the same vicinity.

Several new locations are reported in Shelby County in hot spots that have previously shown some oil and gas. C. A. Parker and others have derrick up on No. 1 W. C. Windham, A. H. English Survey, in the Shelbyville about 7 miles south of the town of Center. Eight miles west of Shelbyville, Tarbud Oil Co. is reported to be arranging to deepen a test recently abandoned at 3,712 feet to 6,000 feet. In the Joaquin area in the northeastern part of Shelby County, H. A. Stebbinger of Tulsa is moving in rig on No. 1 Pickering Lumber Co., C. E. Henry Survey, for a proposed 6,000-foot test.

Estimated Production

Estimated daily gross production of all companies for the week ending November 9, 1935:

NORTH LOUISIANA

	Bbls.
Bellevue	550
Caddo light	4,390
Caddo heavy	2,350
Converse	1,395
Cotton Valley	350
DeSoto and Red River	1,370
Elm Grove	400
Haynesville	3,440
Holly	145
Homer	2,630
Pleasant Hill	175
Rodessa	8,975
Sarepta-Carterville	475
Urania	2,710
Zwolle	1,445
Total	30,800

SOUTH ARKANSAS

Champagnolle	1,965
El Dorado	1,220
Lisbon	315
Miller County	1,380
Nevada	860
Smackover light	2,205
Smackover heavy	17,855
Stephens	635
Urbana	2,240
Total	29,675

Abolition of the federal gasoline tax within a year and a standardized state gasoline tax of 3 cents a gallon throughout the nation is foreseen by Col. T. H. Barton, El Dorado, Ark., president, Lion Oil Refining Co. "The great drawback to the oil business now is the excessive gasoline tax and the lack of uniformity of the tax in various states," he said.

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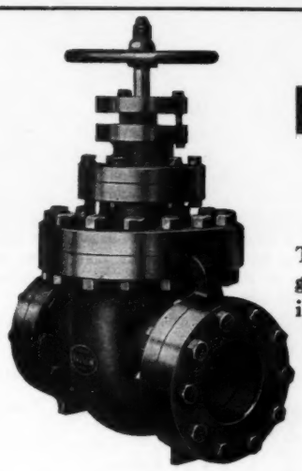

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THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

East and East Central Texas

FIRST TRINITY GAS WELL IN CAYUGA MAKING DISTILLATE

By L. E. BREDBERG

DALLAS, Tex., Nov. 11.—One of the most important discoveries of the year in the East Texas district showed for at least a large gas producer, making distillate and possibly some oil, in the Cayuga field, northwest Anderson County. Tide Water Oil Co. and Texas Seaboard Oil Co., joint discoverers of the Long Lake field, and also discoverers of the Cayuga field about 20 miles north, are responsible for bringing in the first producer, a gasser, in the Trinity sand in East Texas. Their No. 21-A Wills, in the S. Edmondson Survey, near the center of the Cayuga field, is still incomplete with the crews battling the high gas pressure, reported at around 2,700 pounds, to prevent a blow-out while preparing it for completion. Tubing pressure was reported as 1,650 pounds on three-eighths inch choke and casing pressure was 1,000 pounds. It flowed wash water and gas, cleaned itself but showed no oil although one of the officials said it was making some distillate. It is now being tested, crews working cautiously while installing new high test fittings and safety devices to prevent a blow-out. It required 3,300 pounds pressure from pumps, with heavy mud to prevent a blow-out. Tubing was run to around 2,000 feet and the well started to get out of control while that work was being done, but the alert crew averted it.

Total depth was 9,085 feet, but no satisfactory showings of oil were found below upper showings so the companies ordered the hole plugged back inside the casing to 7,395 feet and the casing perforated with 100 holes from 7,210-7,300 feet. The present amount of gas is coming from this 90 feet of hole, which is proving the first Trinity horizon production in the district.

This is the deepest test drilled in the district and one of but a few Trinity sand tests drilled in East Texas. Last year a couple of such tests were completed, one in the Powell field in Navarro County and one in the old Mexia field in Limestone County. Both proved dry in the Trinity. A Trinity sand test drilled by Pure Oil Co. on the northwest flank of the Van structure in the Woodbine producing field in Van Zandt County also proved dry. Tide Water Oil Co. has since purchased considerable acreage in this area and may drill another Trinity sand test in the vicinity of the Van field as a result of its Cayuga strike.

This Trinity gas production insures a larger gas reserve for the new 20-inch gas outlet now being completed from this and the Long Lake field to Fort Worth and Dallas, by Lone Star Gas Co. which contracted with the Tide Water Oil Co. and Texas Seaboard Oil Co. for the gas it produces in its Woodbine sand wells in the two fields.

Wildcatting

Two wildcat locations were staked this week and two abandoned. Morris and others have derrick up on the Pruyear lands, Thomas Hank Survey, 7 miles east of Huntington in Angelina County, and B. J. Russell is rigging up on the O. A. Hall farm in the R. F. Peters Survey in the southwest corner of Bowie County.

Abercrombie and Harrison gave up

Map showing East Texas district and Cayuga field in which the first Trinity sand producer, a gasser, and the deepest test ever drilled in the district, is located

No. 1 Rose in Red River, at a total depth of 1,422 feet. It topped Woodbine at 1,006 feet, Dexter at 1,399 feet and drilled into the Georgetown lime at 1,405 feet, proving dry. Elevation is 475 feet. The other "duster" was in Hunt County; J. F. Morrissey & Co., Inc., abandoned No. 1 Fry, in the C. Davis Survey, 7 miles north of Commerce, at 4,407 feet.

Beren and others abandoned No. 2 Palmer on the edge of the Van field, Van Zandt County, at 1,324 feet with collapsed casing in the hole.

Gulf Production Co. will probably start a test on its Alba block in Rains County after the first of the year.

Another Trinity sand test rumored may be drilled in Titus County, on a block near Talco.

Don F. Cleary's No. 1 C. S. Mowery, J. Bowerman Survey, 10 miles north of Clarksville, in Red River County, proved of some importance when it shut down at 1,144 feet to run a liner after showing 2 gallons of asphalt oil.

E. J. Moran's No. 1 William Mitcham estate, in Camp County, 2 miles north of Newsome, topped Austin chalk at 3,880 feet, and cored from 4,302-20 feet showing 17 feet of gray ashy sand. It is shut down waiting orders.

Long Lake Field

The Long Lake field, southwest Anderson County, is picking up in activities since Tide Water Oil Co. and Texas Seaboard Oil Co., co-discoverers, have completed two oil wells in the north extension, and have possibly opened up the oil producing part of the field. The companies have staked location for No. 3 Shaw and Cern, 933 feet west of No. 1 Shaw and Cern, and in the D. Parker Survey. Standard Oil Co. of Kansas is rigging up in this extension area.

East Texas Field

There were 53 locations in the East Texas field with 40 wells completed, the smallest number completed in three years. One was put on air lift, one was only a gas well, one proved dry in Upshur County, six were pumpers and four were completed on the swab, which left only 27 flowing wells completed.

EAST TEXAS COMPLETIONS

Smith County

Genroe Drilling Co.'s No. 1 B. Gipson, top sand 3,811 feet, total depth 3,812 feet, initial production swabbing 20 bbls. in two hours. Sun Oil Co.'s No. 21-B H. A. Pace, top sand 3,834 feet, total depth 3,835 feet, initial production 20 bbls. in 40 minutes.

Gregg County

Arkansas Fuel Oil Co.'s No. 6-B Harrison, top sand 3,545 feet, total depth 3,570 feet, initial production 25 bbls. in 15 minutes. Atlantic's No. 63 M. Hayes, top sand 3,505-54 feet, total depth 3,554 feet, initial production 137 bbls. hour; No. 66 Hayes, top sand 3,507 feet, total depth 3,560 feet, initial production 132 bbls. hour. Atlantic and Stanolind companies' No. 16 Fishburn, top sand 3,484 feet, total depth 3,523 feet, initial production 133 bbls. hour. Collins-Gray-Wolf's No. 10 C. Fisher, top sand 3,421 feet, total depth 3,435 feet, initial production 10 bbls. 15 minutes.

T. D. Humphrey's No. 1-B L. M. Baker, top sand 3,604 feet, total depth 3,606 feet, initial production swabbing 55 bbls. two hours. J. Long Drilling Co.'s No. 10-A W. A. Owens, top sand 3,622 feet, total depth 3,632 feet, initial production 74 bbls. hour. Shell Petroleum Corp.'s No. 30 J. Moore, top sand 3,553 feet, total depth 3,563 feet, initial production 40 bbls. hour. 2-inch tubing. Sinclair Prairie Co.'s No. 10 York, top sand 3,591 feet, total depth 3,594 feet, initial production 25 bbls. 15 minutes. Stanolind's No. 12 B. Calvin, top sand 3,569 feet, total depth 3,633 feet, initial production 16 bbls. 15 minutes.

B. F. Carroll's No. 1 Mrs. J. Laird, top sand 3,542 feet, total depth 3,600 feet, shale, initial production 280 bbls. six hours, 2-inch tubing. Gulf Production Co.'s No. 25 Culver, top sand 3,551 feet, total depth 3,575 feet, initial production 71 bbls. hour. C. V. Landesberry's No. 6 A. Money, top sand 3,651 feet, total depth 3,657 feet, initial production 20 bbls. hour, 1-inch choke. Louisiana Oil & Refining Co.'s No. 11 Griffin, top sand 3,548 feet, total depth 3,578 feet, initial production 60 bbls. hour.

J. M. Rush's No. 2 C. C. Crews, top sand 3,658 feet, total depth 3,659 feet, initial production 15 bbls. 10 minutes. J. R. Sharp's No. 2 Morton Dicison, top sand 3,553-68 feet, total depth 3,598 feet, initial production pumping 15 bbls. daily. Sinclair Prairie Co.'s No. 54-A King, top sand

3,505-20 feet, total depth 3,526 feet shale, initial production 25 bbls. 15 minutes. Sun Oil Co.'s No. 9 M. Strong, top sand 3,592 feet, total depth 3,600 feet, initial production 64 bbls. hour, 2-inch tubing.

Rusk County

Hurtle Oil Co.'s No. 1 W. M. Sexton, top sand 3,635-57 feet, total depth 3,680 feet, shale, initial production pumping 10 bbls. hour. Martin & Sladek's No. 3 Russell, top sand 3,728 feet, total depth 3,732 feet, initial production 110 bbls. hour. La. Demmer's No. 1 M. Kennedy, top sand 3,576-79 feet, total depth 3,742 feet, initial production pumping 11 bbls. four hours.

Arcadia Refining Co.'s No. 1 Gilstrop, top sand 3,546 feet, total depth 3,595 feet, initial production swabbing 40 bbls. six hours. Elm Oil Co.'s No. 3 McElroy, top sand 3,731 feet, total depth 3,791 feet, initial production 65 bbls. hour. Chester Oil Co.'s No. 2 Hale, top sand 3,578 feet, total depth 3,618 feet, initial production 5 bbls. hour 2-inch tubing. Genroe Drilling Co.'s No. 1 Gilstrop, top sand 3,535 feet, total depth 3,590 feet, initial production pumping 38 bbls. four hours, Howell-Hankin's No. 2 Propes, top sand 3,535 feet, total depth 3,575 feet, shale, initial production swabbing 10 bbls. hour.

Humble Oil & Refining Co.'s No. 8-A J. E. Sexton, top sand 3,666-97 feet, total depth 3,728 feet, initial production 81 bbls. hour. Hunt Production Co.'s No. 25-C Fair, top sand 3,613 feet, total depth 3,622, initial production 38 bbls. 15 minutes; No. 27-C R. W. Fair, top sand 3,621 feet, total depth 3,629 feet, initial production 60 bbls. hour. Luling Oil & Gas Co.'s No. 5 Alford, top sand 3,609 feet, total depth 3,694 feet, initial production 20 bbls. hour, 2-inch tubing, air lift. Marathon Oil Co.'s No. 79 Cross, top sand 3,629 feet, total depth 3,639 feet, initial production 68 bbls. hour 2½-inch tubing. Milford Oil Co.'s No. 8 Finney, top sand 3,612 feet, total depth 3,690 feet, initial production 10 bbls. 25 minutes. Sinclair Prairie Co.'s No. 1 T. B. Arnold, top sand 3,671-95 feet, total depth 3,695 feet, initial production 1,709,000 feet gas, 2-inch tubing.

Sentinel Oil Co.'s No. 2 Frederick, top sand 3,523 feet, total depth 3,640 feet, initial production pumping 20 bbls. day. J. T. Smith's No. 3 H. H. Frederick, top sand 3,599 feet, top Woodbine 3,584 feet, total depth 3,700 feet, initial production pumping 20 bbls. in five hours; No. 4 Frederick, top sand 3,582 feet, total depth 3,703 feet, initial production swabbing 20 bbls. four hours.

Upshur County

E. P. Halliburton's No. 9 J. M. Phillip, top sand 3,719 feet, total depth 3,720 feet, initial production 25 bbls. in 20 minutes, 2-inch tubing. Rancho Oil Co.'s No. 14 Edwards, location abandoned. Sun Oil Co.'s No. 6 E. O'Byrne, top sand 3,701 feet, total depth 3,702 feet, initial production 20 bbls. in 25 minutes, 5-inch casing; No. 1 J. M. Salter, top sand 3,834 feet, total depth 3,856 feet, initial production tested salt water and some oil. Thibodeaux's No. 9 A. J. Sanders, top sand 3,670 feet, total depth 3,679 feet, initial production 100 bbls. hour.

Red River County

Abercrombie & Harrison's No. 1 Rose, total depth 1,422 feet, dry and abandoned, top Woodbine 1,066 feet, Dexter sand 1,399 feet, Georgetown lime 1,405 feet.

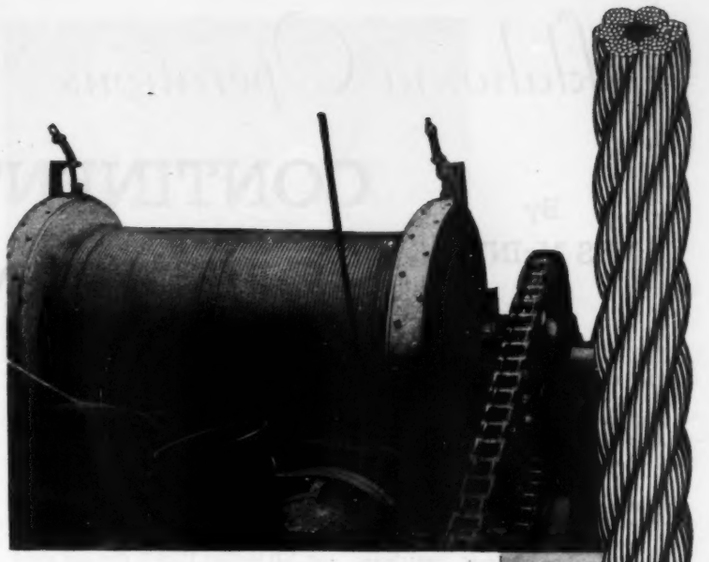
Van Zandt County

Beren, et al's No. 2 Palmer, total depth 1,324 feet, casing collapsed, abandoned.

Petroleum Geophysicists

HOUSTON, Tex., Nov. 11.—A one-day session of the Society of Petroleum Geophysicists will be held at the Baker Hotel, Dallas, Tex., November 29, at which a program of timely geophysical technical papers will be presented. Among the papers to be read will be: "Black Magic in Geophysical Prospecting," by Dr. L. W. Blau, Humble Oil & Refining Co.; "Review of Electrical Prospecting Methods," W. M. Rust, Humble Oil & Refining Co., and "Seismic Computation Assuming the Velocity an Integrable Function of Depth, With an Application," M. M. Slotnick, also of the Humble company.

Ralph W. Nichols, engineer and representative, and Gurney E. Peoples, division manager, both with Black, Sivalls & Bryson, Inc., at Fort Worth, Tex.



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Oklahoma Operations

By JAMES McINTYRE

CONTINENTAL OPENS POOL IN SOUTHERN PONTOTOC AREA

The Continental Oil Co. supplied the feature well of the week in Oklahoma, and incidentally opened a new pool about 3 miles southeast of the Fitts pool. No. 1 McCarty, the progress of which has been closely watched by oil men ever since it spudded in, came in Thursday as an oil producer, showing a production variously estimated from 2,000 bbls. a day upward from the top of a McLish sand at a total depth of 4,622 feet.

The well is located between two Ordovician dry holes as indicated on the accompanying map.

Top of the McLish lime was found at 4,427 feet in the Continental Oil Co.'s test. It had been making a large volume of gas, up to 15,000,000 feet. When McLish sand at 4,621 feet was penetrated a little, the flow of gas was accompanied by a spray of oil which grew in volume until estimates no less than 2,000 bbls. a day were made on the well's flow. The tools were pulled and the well shut in.

The Continental Oil Co. owns about 2,500 acres around the well including all the offset acreage. As the new pool is believed to trend northwest and southeast the company is in excellent position to cash in on the investment. In another part of this edition will be found an article bearing on the geology and other features of the discovery. The expected northwesterly trend makes the test of Delaney and others on the Jesse townsite, shown on the map, look promising.

Love County

Stanolind Oil & Gas Co. and Amerada Petroleum Corp.'s No. 1-A Westheimer & Daube, SW SE SW Section 27-6s-2e, in Love County, found the top of Misener sand at 2,105 feet and top of the Hunton lime at 2,108 feet. A drill stem test at 2,129 feet during which the well was open for 40 minutes, resulted in the hole filling with mud for 40 feet and a slight odor of gas was developed.

The Sinclair Prairie Oil Co.'s deep test in Love County, No. 1 Stockton, SE SE SW section 26-6s-2w, took a core at 6,555-63 feet, recovering 5 feet of it, which showed saturation. At 6,563-68 feet another core was taken and 2 feet of "bleeding" core was recovered, the remainder of the recovered section being dry. A third core at 6,568-73 feet showed no oil.

There was no new development in the Carter Oil Co. and others' 8,088-foot oil discovery in the Fox pool over the week. The crew had been busy for days trying to break out the bridge that has delayed completion of the well.

The Shell Petroleum Corp.'s wildcat in Grant County, No. 1 Foster, NW NW SE section 30-27-7w, has had 8-inch casing set at 5,962 feet. The well may be drilled in with cable tools.

Osage County

Completions in Osage County in the past week included the following wells with their sand records and initial production:

National Refining Co.'s No. 1, SE cor. NE section 11-24-7, dry and abandoned in Arbuckle lime at 2,930-46 feet, total depth.

Sinclair Prairie Oil Co.'s No. 1, SW cor. NE section 15-24-7, shot with 60 quarts at 2,465-84 feet, 390,000 feet of gas in 24 hours, abandoned.

Lewis Production Co. and The Texas Co.'s No. 1, NE cor. SE section 17-24-7, Bartlesville sand at 2,576-2,612 feet, total depth, shot with 60 quarts, 295 bbls. in 24 hours.

Lewis Production Co.'s No. 7, NW cor. SW section 21-24-7, Bartlesville sand at 2,653-82 feet, total depth, shot with 40 quarts, 300 bbls., falling off to 35 bbls. a day.

Carter Oil Co.'s No. 5, SW SE SE section 34-26-6, Bartlesville sand at 2,814-2,906 feet, flowed 1,904 bbls. in 24 hours. Will be used as an input well.

Carter Oil Co. and others' No. 8 Ducotey, SE NE SE section 3-25-6, Bartlesville sand at 2,767-2,853 feet, flowed 737 bbls. the first day and 973 bbls. the second day.

Carter Oil Co. and others' No. 5 Cook, 25 feet from east and 990 feet from north lines of NE section 9-25-6, Bartlesville sand at 2,670-2,736 feet, 1,980 bbls. in 31 hours. Will be used as repressure well.

Carter Oil Co. and others' No. 10 M. DeNoya, 25 feet from east and 1,295 feet from south lines of SW ¼ section 10-25-6, Bartlesville sand at 2,792-2,898 feet, flowed 1,822 bbls. in 21½ hours and 1,968 bbls. in a later 24-hour test. It will be used as a repressure well.

Carter Oil Co.'s No. 8 Presbury, 1,295 feet from north and west lines of NE ¼ section 10-25-6, Bartlesville sand at 2,671-2,767 feet, flowed 753 bbls. the first day, 1,051 bbls. the second and 1,043 bbls. the third.

Rock & Latham's No. 3, 75 feet south and 700 feet west of C section 2-28-10, Peru sand at 1,097-1,150 feet, shot with 160 quarts, no results, plugged back and shot with 60 quarts at 727-40 feet. Pumped 2 bbls. of oil and 5 bbls. of water.

The Texas Co.'s No. 12, NE SW NW section 30-25-8, Burgess sand at 2,415-21 feet, 100 bbls. of oil and 10 bbls. of water in 24 hours.

Barnsdall Oil Co.'s No. 11, NW SW NW section 36-25-11, Bartlesville sand at 1,661-1,729 feet, shot with 110 quarts; flowed and swabbed 53 bbls.

Peters Petroleum Corp. and Oliphant's No. 9, SW NE NW section 32-24-9, Hominy Wilcox sand at 2,480-83 feet, flowed 602 bbls. in 24 hours. It began to show water and was tubed and pinched down to 200 bbls. a day flowing against 180 pounds back pressure.

E. O. Platter and others' No. 6, SE SW cor. SE SE NW section 30-22-9, is a 10-bbl. pumper at 487-502 feet.

New work started in Osage County included J. R. Higgins' No. 16, NW cor. NE SW SE section 25-23-8, deepening, drilling at 2,476 feet; Norbla Oil Corp.'s No. 1, SE cor. NE section 25-24-7, preparing to deepen from 2,848 feet; Lewis Production Co. and The Texas Co.'s No. 2 Claremore, NW NE SE section 17-24-7, material moved in; Champlin Refining Co.'s No. 2 Claremore, SW SE NE section 17-24-7, location; Peters Petroleum Corp. and Sinclair Prairie Oil Co.'s No. 3, SW cor. NE SW NE section 24-24-7, will deepen from 726 feet.

Continental Oil Co. and Gypsy Oil Co.'s No. 15, NW SE NE section 21-24-7, flowed 55 bbls. naturally the first hour from Bartlesville sand at 2,594-2,669 feet.

Logan County

Sinclair Prairie Oil Co. and Slick-Urschel, Inc.'s No. 1 Glenn, NE NE SE section 27-15-3w, in Logan County, a wildcat, was abandoned at 6,418 feet in white sand. It topped Wilcox sands at 6,249 feet and 6,347 feet.

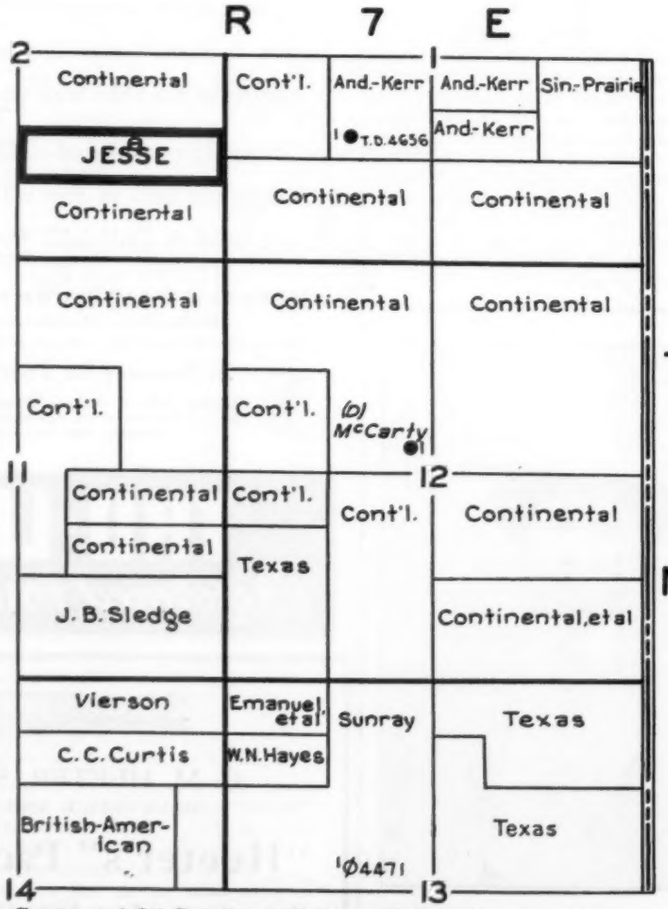
Springrose Drilling Co. was rigging up to start No. 1 Cole, SW SW NW section 32-15-1, Logan County.

Grant County

Shell Petroleum Corp.'s No. 1 Foster, 440 feet south and east of C section 30-27-8w, had Mississippi lime at 5,920 feet, Viola at 5,940 feet and Simpson Dense at 5,957 feet and was at a total depth of 5,962 feet waiting for casing. It will be finished with standard tools.

Noble County

Skelly Oil Co. had cellar and pits dug for No. 3 Hannah, SW SE SW section 22-22-2w, Noble County; Ray Ranger and others, a location made



Continental Oil Co.'s No. 1 McCarty, SE SE NW section 12-1-7, opens pool southeast of the Fitts field, Pontotoc County

(Courtesy of Mid-Continent Map Co., Tulsa)

for No. 1-A Dale, SW SE SE section 13-22-2e.

Skelly Oil Co.'s No. 2 Hannah, SE SW SW section 22-22-2w, in the Polo pool, Noble County, flowing from pays at 4,860-68 feet and 4,901-30 feet, flowed 163 bbls. of oil per hour. It was acidized with 2,500 gallons, but not yet tested. Wilcox sand lay at 4,905-30 feet, total depth. The upper pay was Viola lime.

In the Lucien pool, Noble County, Carter Oil Co.'s No. 2 Pfeiffer, 390 feet from south and 660 feet from west lines of SE ¼ section 33-20-2w, had second Wilcox sand at 5,060 feet, total depth 5,130 feet, and flowed 527 bbls. of oil in 24 hours and was shut in.

Sinclair Prairie Oil Co.'s No. 2 Frederick, 385 feet from south and 660 feet from east lines of NE ¼ section 33-20-2w, flowed and swabbed 190 bbls. in 24 hours from first Wilcox sand at 5,038-74 feet, total depth 5,117 feet.

Oklahoma

Estimated daily average production of Oklahoma for week ending November 9 and for the preceding week is as follows:

	Barrels	
	Nov. 9	Nov. 2
Allen	7,125	6,500
Asher-West Asher	975	1,025
Burbank	8,000	8,000
South Burbank	11,500	11,250
Balance Osage	24,000	24,000
Blackwell	4,750	4,750
Bristow-Slick	8,750	8,750
Chandler	4,200	4,225
Crescent	5,100	4,850
Cromwell	4,025	4,150
Cushing-Shamrock	12,250	12,500
Duncan district	4,250	4,325
Edmond	8,675	5,700
Fish	9,300	9,475
Fitts	25,025	33,375
Gray	1,450	1,775
Graham	4,175	5,550
Healdton	9,200	9,250
Hewitt	4,500	4,500
Holdenville	1,275	1,300
Keokuk	1,525	1,900
Konawa	1,675	1,700
Lucien	10,100	9,800
Marshall-Lovell	975	975
Oklahoma City	144,200	134,425
Papoose	1,125	1,200
Polo	3,450	3,325
Sasakwa and townsite	2,825	2,975
Sholem-Alechem	3,750	3,750
Seminole field:		
Bowlegs	8,900	9,525
Carr City	3,000	4,275
Earlsboro	8,550	8,725
South Earlsboro	1,050	950
East Earlsboro	10,300	10,500
Little River	14,375	14,450
East Little River	900	900
Maud	1,050	1,275
Mission	2,675	2,850
Seminole	12,150	11,500
East Seminole	1,075	1,275
Searight	3,325	5,275
Total Seminole	67,350	71,500
St. Louis-Pearson	21,700	22,150
Tatums	4,200	4,250
Tonkawa-Garber-Thomas	5,800	5,800
Wewoka	3,600	3,600
Yale-Jennings	4,200	4,200
Other pools	55,575	55,600
Total Oklahoma	490,575	492,400

Greater Seminole Area

Greater Seminole completions in the past week included the following wells:

Magnolia Petroleum Co.'s No. 3 Browning, C W half SE NW section 14-10-6, Misener sand topped at 4,144 feet, Hunton lime at 4,158 feet, total depth 4,159 feet, flowed 286 bbls. of oil in 24 hours through tubing, a Misener sand well.

Wood Oil Co.'s No. 1 Templeton, NW SE SW section 28-9-6, Wilcox sand at 4,123-40 feet, total depth, shot with 30 quarts, swabbed 1,758 bbls. of oil in 48 hours.

Fitzpatrick and others' No. 3 Dixon, SW SW NE section 12-9-8, Olympic pool, Hughes County, Senora sand at 1,715-50 feet, shot with 50 quarts, flowed 185 bbls. in 20 hours.

Manahan Oil Co. and others' No. 2 Dixon A, SE SW NW section 12-9-8, Senora sand at 1,700-65 feet, shot with 60 quarts, flowed 260 bbls. in eight hours.

Empire Oil & Refining Co.'s No. 4 Davis B, 273 feet from south and 307 feet from east lines of NE ¼ section 30-7-8, Fish pool, Seminole County, Wilcox sand at 4,127-28 feet, total depth, pumped 143 bbls. of oil in six hours.

Mexhoma Oil Co.'s No. 3 Butler, SW cor. section 21-5-8, Allen district, Pontotoc County, sand at 796-827 feet, pumped 20 bbls. in 24 hours.

Senora Oil & Gas Co.'s No. 4 Gilmore, 990 feet south and 150 feet west of NE cor. section 22-5-8, Allen sand at 796-808 feet, total depth, shot with 22 quarts, pumped 20 bbls. initially.

Gypsy Oil Co.'s No. 2 Factor, NW NE SE section 14-6-5, Simpson Dolomite at 3,751-3,830 feet, shot with 100 quarts, pumped 279 bbls. in 12 hours.

Turman Oil Co.'s No. 1 Factor, NE NW SE section 14-6-5, Simpson Dolomite at 3,745-3,820 feet, total depth, pumped 197 bbls. in 12 hours.

Maud Oil & Gas Co.'s No. 1 Smith, NE NE SW section 2-7-4, Maud pool, Pottawatomie County, deepened from 4,123 feet to Second Wilcox sand at 4,368-72 feet, was a hole full of water and was abandoned.

Stewart Egan and others' No. 3 Brister, SW NW NE section 28-7-4, Simpson Dolomite at 4,095-4,135 feet, total depth, pumped 244 bbls. of water and 20 bbls. of oil in 24 hours.

Superior Oil Co.'s No. 1-A Long, 405 feet from north and 990 feet from west lines of NE ¼ section 5-6-4, Viola lime at 4,233-4,313 feet and Simpson Dolomite at 4,313-57 feet, got a hole full of water and plugged back to 4,320 feet where the well made a 45-bbl. initial production.

Carter Oil Co. was digging cellar for No. 1 Kiker, C W half NW NE section 14-10-6; Twin Oaks Oil Co., a location for No. 1-A Dorris, 430 feet from south and 330 feet from east lines of SW ¼ section 31-10-7; Clyde McMichael, location for No. 1 Miller, SW SW NW section 24-10-5, all in Seminole County; Blackwell Oil & Gas Co., location for No. 2 Oliphant, SW SE SW section 1-9-8, Hughes County; Blackwell Oil & Gas Co., rig on the ground for No. 1 Oliphant, SE SE SW section 1-9-8; Manahan Oil Co. and others, rigging up rotary, for No. 2 Oliphant, NW NW SW section 12-9-8; W. A. Delaney, rigging up machine for No. 5 Gilman, NE cor. section 29-5-8, Allen area, Pontotoc County; L. A. Schumacher and others, rig on ground for No. 1 Schumacher, NE NW NE section 23-5-10, Hughes County.

In the Sand

Stanolind Oil & Gas Co. and Amerada Petroleum Corp.'s No. 1 Austin Hall, 790 feet from south and 890 feet from west lines of NW ¼ section 8-6-8, Sasakwa pool, had Wilcox sand at 4,124-31 feet, total depth. It had a good showing of oil. Standard tools were being rigged up.

Blackwell Oil & Gas Co.'s No. 5 Baker, 330 feet south and 255 feet east of C section 11-7-6, Seminole County, filled with water at 3,120 feet, was plugged back to 3,100 feet. Booch sand was topped at 3,092 feet.

W. R. Ramsey's No. 1-A Jacobs, 990 feet from west and 330 feet from north lines of NE ¼ section 14-7-8, Hughes County, deepened from 2,932 feet to 3,190 feet, had 1,000 feet of oil in the hole. Gilcrease sand was

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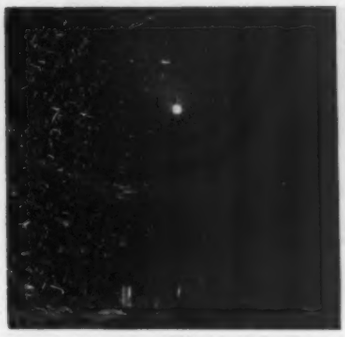

FROM THE HEART OF THE DUST STORM AREA

a city manager wrote us—

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REMEMBER—IT'S THE DUST THAT'S THE WORST

1944

topped at 3,100 feet and pay began at 3,138 feet.

Tom Phillips and others' No. 1 Harjo, NW NW SW section 34-8-7, was shot with 20 quarts at 3,185-3,218 feet and swabbed and flowed 70 bbls. in 18 hours.

Potco Oil Co.'s No. 3 Dixon, NW NE NW section 12-9-8, in the Olympic pool, Hughes County, had a showing of oil at 1,693-95 feet and was rigging up standard tools. Same company's No. 4 Dixon, was also showing oil at 1,696-70 feet and was standardizing. Shepard's No. 2 Oliphant, NW NE SW section 12-9-8, had sand at 1,708-10 feet and was standardizing.

Burke Greis Oil Co.'s No. 1 McDaniel, NE NE NW section 31-10-6, was drilling at 4,333 feet with 400 feet of water in the hole. Wilcox sand was topped at 4,292 feet. Tom Phillips and others' No. 1 Bynam, C S half SW NW section 26-11-6, Seminole County, flowed 288 bbls. of oil and 10 bbls. of water from Hunton lime at 4,124-51 feet. It had been acidized.

Fitts Pool

E. H. Moore and others' No. 4 Craddock, SW SW SW section 29-2-7, deepened from 4,069 feet, 7 feet in McLish lime, to 4,333 feet, made a new potential production of 2,475 bbls. of oil and 2,500,000 feet of gas. It is a Bromide and McLish producer. Same operators' No. 8 Craddock, SE SW SW section 29-2-7, deepened from McLish lime at 4,041 feet to 4,322 feet, was credited with a new potential of 3,571.5 bbls. and 2,443,832 feet of gas. It produces from Bromide and McLish sands. Moore and others' No. 1 Atkins, NW NW NW section 32-2-7, was deepened from 4,050 feet, 2 feet in McLish lime, to 4,317 feet, and was given a new potential of 2,978.64 bbls. with gas at the rate of 4,400,000 feet. It produces from Bromide and McLish sands.

Moore and others' No. 2 Atkins, NE NW NW section 32-2-7, deepened from 4,035 feet, 5 feet in McLish, to 4,293 feet, made a potential of 3,556.78 bbls. with 3,900,000 feet of gas. Its old potential was 2,095 bbls. from Bromide sands. It now produces from Bromide and McLish. Same operators' No. 3 Benton, NW SW NW section 32-2-7, was a failure. It had Arbuckle lime at 4,963 feet and was drilled to 5,230 feet. It had a small showing of oil with a sulfur odor in a core at 4,991-96 feet. The hole was abandoned.

Near Completions

Blackstock and others' No. 2 Lewis, SE cor. section 19-2-7, flowed 120 bbls. in 22 hours at a total depth of 4,397 feet and was acidized. It had a hole full of water from second Bromide sand and was plugged back to first sand.

Amerada Petroleum Corp.'s No. 3 Smith, SW SE NW section 28-2-7, flowed 1,333 bbls. in four and three-quarter hours through casing and 582 bbls. in four and one-quarter hours through tubing at a total depth of 4,290 feet.

Bishop Oil Co.'s No. 1 Simpson, NW SW NW section 28-2-7, flowed 2,928 bbls. in 23 hours through tubing at a total depth of 4,299 feet.

Moore and others' No. 5-A Craddock, 1,065 feet from west and 405 feet from north lines of SW ¼ section 29-2-7, flowed 100 bbls. of oil in two hours at 4,360 feet and was shut in for potential.

Moore and others' No. 1 Harper, SW SW NE section 29-2-7, at a total depth of 3,625 feet, flowed 115 bbls. of oil and about the same quantity of mud in one and one-quarter hours.

Moore and others' No. 1 Mobley, NW NW NE section 32-2-7, made a potential production of 1,429.68 bbls. at a total depth of 4,375 feet. It was deepened to 4,427 feet and flowed 112 bbls. in one hour while tubing was being run. It was shut in for another potential test.

Beckham County

In Beckham County, G. E. Martin's No. 1 Hood, C NE NW section 7-8-23w, a wildcat, was dry and abandoned at 2,562 feet. It finished up in shaley granite wash.

Okmulgee County

Stekoll, Moffett & Blackwell's No. 12 Harkins, NE SW SE section 6-11-12, Okmulgee County, had sand at 2,368-86 feet and produced 50 bbls. of oil and 50 bbls. of water in 24 hours.

Payne County

Amerada Petroleum Corp.'s No. 1 Jones, SW cor. section 27-19-3, Payne County, had Wilcox sand at 4,310-16 feet and on its potential test flowed 983 bbls. in 24 hours and was completed. It also showed 715,000 feet of gas.

Amerada Petroleum Corp. had cellar dug for No. 1 Clingenspeel, NW NW NW section 34-19-3e, in the Stillwater pool.

Okfuskee County

Sunray Oil Co.'s No. 1 Culla, NE SW NE section 13-12-8, a wildcat in Okfuskee County, was a hole full of water from second Wilcox sand at 4,190-94 feet, and will be plugged back to 4,001 feet and acidized to test Hunton topped at 3,985 feet.

Oklahoma County

Capitol Courts Oil Co.'s No. 1 Great Northern, 860 feet from south and 700 feet from east lines of SW ¼ section 23-12-3w, in the Oklahoma City town lot operations was dry and abandoned at 6,680 feet.

Larkin & Warr's No. 1 Bryant School, 419 feet south and 51 feet west of C section 34-12-3w, had Wilcox sand at 6,386-6,506 feet. It was credited with a potential production of 439.86 bbls. and was completed. Larkin & Warr abandoned the location for No. 1 Military on Lot 15, Block 1, Military addition, in section 34-12-3w.

Travis Petroleum Co.'s No. 2 Lucas, 971 feet from west and 276 feet from north lines of SW ¼ section 36-12-3w, was acidized in Simpson sand at 6,275-6,488 feet and flowed 2,100 bbls. of oil in 24 hours with 5,000,000 feet of gas. It was completed.

Continental Oil Co. had cellar dug for No. 5 Young, NW NE NW section 31-14-3w, Edmond pool; British American Oil Co., cellar dug for No. 1 Kersch, 981 feet north and 987 feet east of SW cor. section 23-12-3w, Oklahoma City (corrected location); Phillips Petroleum Co., cellar dug for No. 5 Traders Compress, 1,320 feet from south and 1,113 feet from east lines of SW ¼ section 36-12-3w, Oklahoma City.

Larkin & Warr's No. 1 Gibbons, 290 feet from south and 576 feet from east lines of NE ¼ section 34-12-3w, flowed 740.64 bbls. in 24 hours with the drill pipe stuck in the hole. Wilcox sand was topped at 6,282 feet, total depth.

In the Britton area J. E. Mabee's No. 1 Haskins, 495 feet from south and 993 feet from east lines of NE ¼ section 20-13-3w, total depth 6,690 feet, was acidized with 7,000 gallons and it flowed 656 bbls. of oil in 15 hours. Later it settled to 105 bbls. in 24 hours.

Cleveland County

Sinclair Prairie Oil Co. and others' No. 1 Hussman, SW SE SW section 21-10-2w, in the Moore district, Cleveland County, drilled into water when the bailer was run 4,000 feet in the 7,490-foot hole and the well was shut down for orders.

In Southern Fields

Burk Royalty Co.'s No. 3 Minor A, SE NE NE section 15-1-20w, Jackson County, was completed in Granite Wash at 1,447-55 feet and swabbed and flowed 258 bbls. in six days.

B. B. Bacon"s No. 2 Fahy, 760 feet north and 230 feet east of SW cor. section 21-2n-10w, Comanche County, was dry and abandoned at 903 feet. Sand at 870-78 tested only a showing of oil.

Stahl Petroleum Co. was rigging rotary tools for No. 1-A Callaway, SE cor. NE section 17-1n-8w; Nash and others, machine in for No. 1 Sadler, a wildcat, SW cor. NW NW SE section 30-2n-4w; C. F. Dillingham and others, location for No. 1 Hallum, NE cor. section 36-2n-5w, all in Stephens County; Wirt Franklin Petroleum Corp.'s No. 3 Pearce, NE SE NE section 18-2s-2w, Carter County, a rig; H. S. Chaney and others' No. 1 Webb, NE SE SW section 4-1n-20w, a machine; English Drilling Co., rigging up rotary tools for No. 1 Clark, NE cor. SE section 28-2-10w, Comanche County; H. S. Chaney and others, a machine in for No. 1 Webb, NE SE SW section 4-1n-20w, Jackson County.

Remmel Ends Tour of Mid-Continent Area

S. F. Remmel, recently appointed assistant sales manager for the oil-tool division of the Byron Jackson

S. F. REMMEL

Co., Los Angeles, Calif., has completed an extended trip through the Mid-Continent territory. He was accompanied by C. F. Vincent, Mid-Continent manager for the company, who introduced him in petroleum circles.

Kansas Developments

TWO NEW POOLS IN BARTON COUNTY OPEN AUSPICIOUSLY

By JAMES McINTYRE

One of the quietest weeks in several months was the record of the Kansas fields in the past week, the number of completed wells and new operations being unusually low. Barton County boasts of two new pools opened in the past fortnight and one of the discovery wells was completed in the past week with an initial production of 995 bbls. in 17 hours actual pumping time, while the other, yet to be completed, tested 435 bbls. in 18 hours, both of them Siliceous lime wells. Russell County passed a week in which no wells were completed. The Oxford pool in Sumner County kept up its record of big wells, one of the Dolomite tests not yet completed, producing 2,152 bbls. in 22 hours, but expected to develop a larger production when completed.

Kansas

The estimated daily average production of Kansas for the week ending November 9 and for the preceding week follows:

	Barrels	
	Nov. 9	Nov. 2
Oxford City	5,100	9,275
Burrton	16,425	15,875
Ritz-Canton	6,650	8,325
Hollow	2,650	3,075
Voshell	3,300	3,475
Nikkel	2,500	2,760
Ellsworth County:		
Lorraine	8,675	11,175
Other pools	1,625	1,850
Rice County:		
Chase	11,425	12,425
Raymond	1,825	2,420
Steckel	2,625	2,975
Keesling	1,580	2,105
Other pools	3,585	3,250
Russell County:		
Fairport	2,160	3,762
Gorham	2,850	3,039
Russell	1,850	2,100
Other pools	1,715	2,400
Sedgwick County	6,710	6,750
Barton County	1,948	2,300
Ellis County	400	380
Kingman County	725	822
Stafford County	1,990	1,368
Greenwood County	10,875	10,850
Butler County	18,000	17,750
Other fields	18,487	19,359
Total Kansas	135,675	149,825

Barton County

Lario Oil & Gas Co.'s No. 1 Peter, NW cor. section 24-20-11w, which opened a new pool in Barton County, was completed after it had produced 995 bbls. in a 17-hour test from Siliceous lime at 3,273-91 feet, total depth. It had been acidized. It had made 220 bbls. the first four hours, but the 17 hour test was apart from this.

Mid-Continent Petroleum Corp. was rigging up rotary for No. 1 Matzek, SE SE SE section 25-19-11w. Hilliggoss and others had cellar dug for No. 1 Schmidt, a wildcat in NE NE NE section 27-19-11w. Gypsy Oil Co. made a location for No. 1 Zahorsky, SE SE SE section 14-20-11w.

Torrey & Feaster's No. 1 Feist, which opened a pool in NE NE SE section 29-18-11w, had not yet been completed but it tested 435 bbls. in 18 hours actual pumping time producing from Siliceous lime at 3,430-32½ feet. The oil is 37 degrees in gravity.

Magnolia Petroleum Co.'s No. 1 Steckel, SE SW NE section 1-20-11w pumped 603 bbls. of oil in 24 hours from pay at 3,279-88½ feet and was acidized with 1,000 gallons.

Ellsworth County

Phillips Petroleum Co. completed No. 4 Melchert, NW SE NE section 23-17-9w in the Lorraine area, Ellsworth County. It started at 881 bbls. of oil per day from Siliceous lime at 3,196-3,200 feet.

Skelly Oil Co.'s No. 7 Dees, NW SE SW section 14-17-9w was completed in Siliceous lime at 3,186-88 feet. It produced 969 bbls. in 24 hours. Gypsy Oil Co. and Texas Co.'s No. 1 Lapham, a wildcat in SW cor. section 27-16-7w was abandoned after Siliceous lime at 3,038-77 feet showed nothing but water.

The Texas Co.'s No. 1 Becker, NE NE SE Section 26-17-10w had Siliceous lime at 3,250-65 feet. It was completed after it had made a four-day potential test averaging 199 bbls. of oil and 20 bbls. of water per day.

C. B. Davis and Winkler & Koch's No. 6 Melchert, SW NE NE section 23-17-9w pumped 1,540 bbls. of oil in 24 hours from Siliceous lime at 3,179 feet, but was not completed. The Texas Co.'s No. 6 Dees, SW NE NW section 23-17-9w had Siliceous lime at 2,170-76 feet and 2,600 feet of oil in the hole.

Rush County

Darby Petroleum Co. is reported to have abandoned the location for No. 1 Jacobs, SW SW NW section 3-16-19w, in Rush County.

Rice County

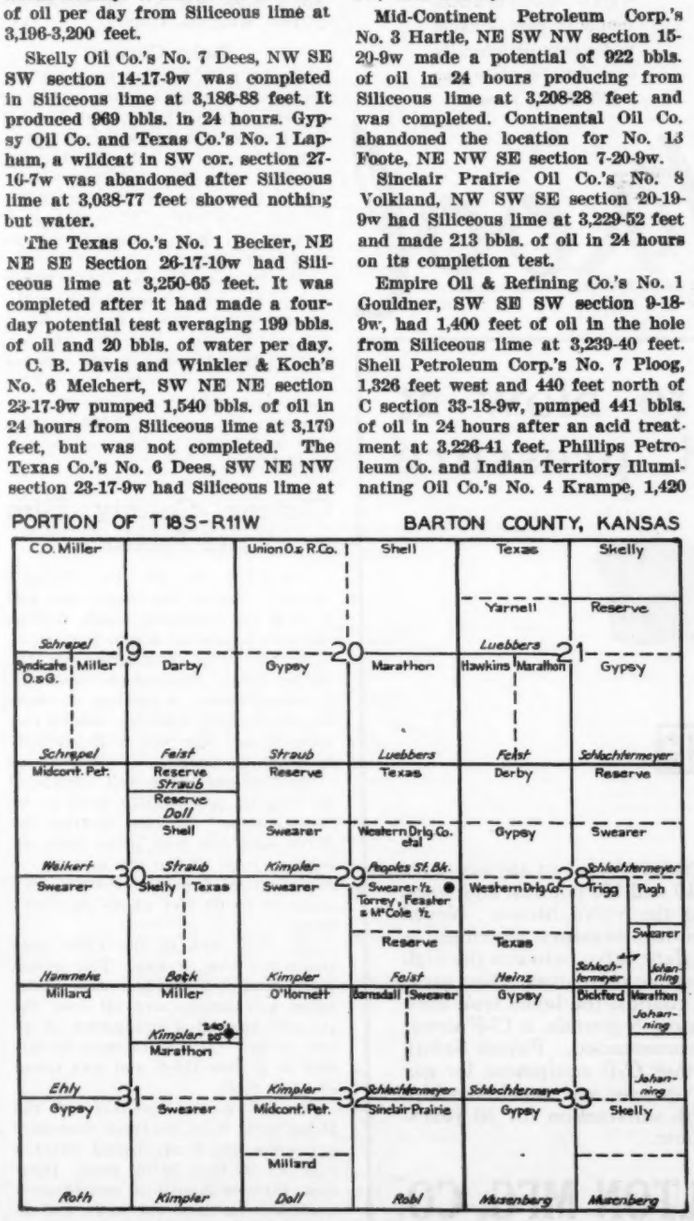
Continental Oil Co. and others abandoned the location for No. 1 Buckbee, SE NW SW section 13-18-8w, Rice County.

Mid-Continent Petroleum Corp.'s No. 3 Hartle, NE SW NW section 15-20-9w made a potential of 922 bbls. of oil in 24 hours producing from Siliceous lime at 3,208-28 feet and was completed. Continental Oil Co. abandoned the location for No. 13 Foote, NE NW SE section 7-20-9w.

Sinclair Prairie Oil Co.'s No. 8 Volkland, NW SW SE section 20-19-9w had Siliceous lime at 3,229-52 feet and made 213 bbls. of oil in 24 hours on its completion test.

Empire Oil & Refining Co.'s No. 1 Gouldner, SW SE SW section 9-18-9w, had 1,400 feet of oil in the hole from Siliceous lime at 3,239-40 feet. Shell Petroleum Corp.'s No. 7 Ploog, 1,326 feet west and 440 feet north of C section 33-18-9w, pumped 441 bbls. of oil in 24 hours after an acid treatment at 3,226-41 feet. Phillips Petroleum Co. and Indian Territory Illuminating Oil Co.'s No. 4 Krampe, 1,420 feet north and 50 feet west of SE cor. section 31-19-10w, filled 1,850 feet with oil in one and half hours from pay at 3,281-84 feet. Stanolind Oil & Gas Co.'s No. 2 Mitchell, 1,704 feet north and 126 feet east of SW cor. section 32-19-10w swabbed 200 bbls. of oil in two hours from pay at 3,284-86 feet.

Gypsy Oil Co.'s No. 3 Coffman, NW SW SW section 5-20-9w filled 1,400 feet with oil in 31 hours at 3,233-48 feet.



Torrey, Feaster and others open another Siliceous lime pool in Barton County with No. 1 Feist, section 29-18-11w

(Courtesy of Mid-Continent Map Co., Wichita, Kans.)

Reno County

Stanolind Oil & Gas Co. and Amerada Petroleum Corp.'s No. 1 Hilger A, NE NE SW section 21-26-4w, Reno County, was dry in Wilcox sand at 4,068-76 feet, total depth 4,194 feet and was abandoned.

Cowley County

E. B. Shawver's wildcat test, No. 1 Hanna, NE NW SE section 29-30-3, Cowley County was a hole full of water in the Simpson formation at 3,299-3,305 feet and was abandoned.

Wakefield and others' No. 1 Auman, SE SE NE section 32-33-3, started at 15 bbls. a day from sand at 3,279-3,338 feet and was completed.

Gralapp and others have cellar dug for No. 1 Cook, SE SW SE section 13-32-4.

Sedgwick County

Dickey Oil Co. completed No. 4 Brown, SW NW NE section 20-28-1e in Chat at 3,073 feet, total depth 3,117 feet. It was acidied and made 183 bbls. of oil in 24 hours.

D. R. Lauck and Shore Line Oil Co.'s No. 3 Jordan, NW NW SE section 6-28-1w made a potential production of 1,448 bbls. of oil and 725 bbls. of water from Simpson at 3,666-70 feet. This well came in in September, but the owners delayed completing it to get into condition to make its best showing.

Greenwood County

Lyke and others' No. 3 Hillman, SE NE NE section 35-23-11, Greenwood County, is a 15-bbl. completion at 1,860-85 feet, after a 50-quart shot.

Sinclair Prairie Oil Co.'s No. 1 Martindell, 980 feet north and west of SE cor. section 30-23-10 was dry and abandoned at 2,427 feet. Barren sand was penetrated at 2,332-58 feet.

Gore & Phillips were drilling at 875 feet in No. 8 Beal, 660 feet from south and 1,185 feet from east lines of NE quarter section 28-23-11.

Russell County

There were no completions in Russell County in the past week but there were wells in the pay. Phillips Petroleum Co.'s No. 1 Downing, SE SE SW section 19-13-14w pumped 110 bbls. of oil and 24 bbls. of water from Oswald lime topped at 3,008 feet. Hartman & Blair's No. 1 Boxberger, NE NE NE section 26-14-14w, pumped 50

bbls. of oil and salt water in 24 hours from Oswald lime at 2,934 feet, pay at 3,010-12 feet. Sinclair Prairie Oil Co.'s No. 2 Sellens, NW NW NE section 35-15-13w, pumped 127 bbls. of oil and 180 bbls. of water in 24 hours from 2,868-90 feet.

Sumner County

E. B. Shawver's No. 1 Barlow, NW SW NE section 33-31-1w, Wellington pool, Sumner County, averaged 228 bbls. a day on its 48-hour potential test, producing from Mississippi lime at 3,642-96 feet. It had been acidized.

T. M. Deal Oil & Gas Co. had material in for No. 1 Peter, NW NW SE section 23-32-2. Craft and Wilson spudded and shut down No. 1 Nevitt, NE NW NE section 36-32-2.

Shell Petroleum Corp.'s No. 1 Scroggins B, 1,103 feet north and 1,087 east of SW cor. section 14-32-2 in the Oxford pool deepened from 2,104 feet to 2,988 feet pumped 200 bbls. of oil and 57 bbls. of water in four hours. Stanley & Jarvis and others' No. 1 Scroggin, 1,310 feet north and 1,000 feet east of C section 14-32-2, flowed 37 bbls. of oil in 24 hours at 2,943 feet.

Lario Oil & Gas Co. and Barnsdall Oil Co.'s No. 10-A Wenrich, (a twin), 631 feet from east and 720 feet from north lines of NW quarter section 23-32-2 flowed 2,152 bbls. in 22 hours at a total depth of 2,835 feet.

Stafford County

Stanolind Oil & Gas Co. made a location for No. 1 Spangenberg, NW NW NW section 29-22-11w, Stafford County, and was moving in material for No. 2 Heyen B, NE NW NE section 32-22-11w.

Pratt County

Skelly Oil Co.'s No. 1 Maxedon, SE SE NW section 25-27-11w, on the Pratt County side of the Cunningham pool, was completed in Lansing lime at 3,421-25 feet, total depth. It was acidized and produced 242 bbls. of oil in 24 hours.

Kingman County

Skelly Oil Co. had ponds dug for No. 2 Miles, NW NW SE section 30-27-10w, Kingman County.

Butler County

Emrich's No. 1-A Heorman, SW cor. section 20-26-3, Butler County was reported abandoned at 1,250 feet. It had been shut down since last May.

Fairview Oil Co.'s No. 1 Brainard, SE NE NE section 3-25-3 was completed in Mississippi lime at 2,733-58 feet, with pay at 2,738-41 feet. It is a 100-bbl. initial pumper after an acid treatment.

The Western Kansas Oil & Refining Co. had not yet completed its discovery well in Butler County, No. 1 King & Marshall, NW NW SW section 11-28-6. It pumped 290 bbls. of oil in 24 hours and 300 bbls. of oil the second 24 hours on a two day test. Simpson was topped at 3,019 feet and pay was found in Siliceous lime at 3,044-49 feet.

Clarion County Fifth Sand Producer

OIL CITY, Pa., Nov. 11.—Filling a 100-bbl. tank in less than a day and a half of 10-minute heads flowing through a cap and 2-inch pipe, C. H. Weaver's latest completion on the Mahle farm, Washington Township, Clarion County, is baffling attempts to run tubing with its 100,000-foot flow of gas. The well will probably be tubed Tuesday.

This is the third well completed by Weaver in the Fifth sand in recent months. In this district the Fifth sand has been given little attention, most of the gas and oil being produced from the Fourth sand, lying 40 to 60 feet above the Fifth sand.

The first well in the Fifth sand pumped 7 bbls. a day. The second Fifth sand well, 300 feet west of the latest completion, sent oil over the rig and showed a production of 25 bbls. a day. The Fifth sand in this well is 21 feet thick and was found at 1,257 feet.

On the south boundary of the Mahle farm there are three Speechley gas wells which are bailed twice a year for 50 bbls. of oil each. However, little is known of underground conditions in these old wells, and as the Speechley is found at more than 2,100 feet, the oil contribution of the upper formations cannot be estimated under the present arrangement. Mr. Weaver believes that if a Fifth sand oil pool of any size is outlined in this section, the trend will be found almost exactly northeast and southwest, with the larger producers located along a strip less than half a mile in width.

Gulf Coast Drilling

(Continued from Page 99)

ducers were completed for the Shell Petroleum Corp. and Texas Co. The Shell well, No. 9 Hubbard, made an initial of 51 bbls. per hour. No. 2 Wood-Welder well of the Buchanan-Blanco Oil Co. in Seven Sisters came in for 24 bbls. per hour. Another 200-bbl. producer was completed for the Plymouth Oil Co. in Plymouth field of San Patricio County. Buchanan is also drilling No. 3 Mary C. Hubbard for the Humble Oil & Refining Co. in Loma Novia.

George W. McMurray of San Antonio completed Home Oil Co.'s No. 8 Bassinger and has moved to No. 7 location in the Dirks field of Bee County.

Trinity Drillers, Inc., of San Antonio, announced four new contracts last week. They will drill the following wells: S.R.C. Oil Corp.'s No. 16-A Trevino, in Survey 66, Escobas Field, Zapata County; Superior Oil Co.'s No. 1 Billings, in Section 109, offset to Lewis' No. 1 Lopez, new strike in Webb County; Trinity Drillers, Inc., and Groups No. 1 and 2 Oil Corp.'s No. 1 McNeill, in Block 10 of the Jane Curry Survey, Live Oak County; and Welder Oil & Gas Co.'s No. 1 Welder, in the Felipe Dimmit Two League grant, Victoria County. The contractors are waiting on a gasoline rig to begin Slick-Urschel's No. 1 Watson & Shipp in the new Fort Merrill Field in Live Oak County. During the week they completed reconditioning Continental Oil Co.'s No. 1 Sevier in the Driscoll Field, Duval County, and the well was shut in for storage.

Taxing Agencies

One large company recently reported that it pays taxes each year to 2,064 governmental agencies. These include the federal government, 25 states, 712 counties, 798 cities, 252 school districts, 60 road districts, 8 poor districts, 7 fire districts, and 1 water district.

Between 1925 and 1934 this company's taxes other than for income increased to $3,000,000 from $752,826. In the same period its gasoline tax payments for consumers increased to $17,900,000 from $1,719,799.

Legal

The Secretary of the Interior, Washington, Advertisement—Call for Bids To Purchase Royalty Oil and Royalty Gasoline Accruing to the United States from the Salt Creek, Wyoming, Oil Field. Sealed proposals, in duplicate, will be received in the office of the Secretary of the Interior, Washington, D. C., on or before noon December 2, 1935, from responsible bidders for the purchase, beginning January 1, 1936, of royalty oil and royalty natural or casinghead gasoline accruing to the United States from Government lands in the Salt Creek, Wyoming, oil field. Detailed specifications on quantities offered for sale, required form of bids, deliveries, volume measurements, gravity determinations, bond requirements, and action on bids, should be obtained by prospective bidders from the Director, Geological Survey, Department of the Interior, Washington, D. C. the Supervisor, U. S. Geological Survey, Casper, Wyoming, or the Register, U. S. Land Office, Cheyenne, Wyoming. Sealed bids are to be submitted to the Secretary, Department of the Interior, Washington, D. C., pursuant to the specifications, the envelope to be marked plainly "Bid on Salt Creek Royalty Oil (Gasoline)." No bid received after the time herein fixed for submitting bids will be considered. (Sgd.) Harold L. Ickes, Secretary of the Interior. Nov. 1, 1935.

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When you have a GOTT Water Cooler handy, you will always be assured of a fresh supply of pure drinking water kept delightfully cool. *Order one from your supply store . . . now!*

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H. P. GOTT MFG. CO. • Winfield, Kansas

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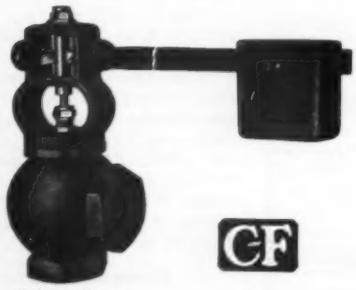
Can be set to blow at any desired pressure



Fulton Lever Safety Valve

SET the Fulton Lever Safety Valve at any pressure you desire, between 10 and 100 pounds, and when that pressure is reached the valve blows. Never sticks. Never fails. For low pressure distribution, it is advisable to have a safety valve between the high pressure and the low pressure regulators. For pressures between 5 and 100 pounds, the lever type here shown,—for pressures below 5 pounds, a C-F deadweight safety valve is recommended. Fulton Safety Valves, regulators, and other C-F equipment for gas control are of superior design and workmanship. They have been used with satisfaction for 50 years. Full information on request.

THE CHAPLIN-FULTON MFG. CO.

28-40 Penn Avenue Pittsburgh, Pa.

Exhibitors Who Have Signed Contracts for International Petroleum Exposition

With space reservations made by 216 exhibitors, representing more than 350 separate companies, the International Petroleum Exposition has already sold more space for the May 16 to 23, 1936, oil show in Tulsa than was sold for the 1934 exposition, according to W. B. Way, general manager.

"The majority of the 1934 exhibitors have contracted for increased space, particularly on the outside blocks," said Mr. Way. "This indicates that the ninth exposition will have more big operating exhibits and that many new inventions, improvements and processes have been developed since the 1934 show."

A partial list of exhibitors who have reserved space for the 1936 exposition are:

A

Ahlberg Bearing Co., Chicago.
Air Reduction Sales Co., New York.
Allis-Chalmers Manufacturing Co., Tulsa.
Allsteel Products Manufacturing Co., Wichita, Kans.
American Arch Co., New York.
American Cable Co., Bridgeport, Conn.
American Can Co., Chicago.
American Hammered Piston Ring Co., Baltimore, Md.
American Iron & Machine Works Co., Oklahoma City.
American-LaFrance & Foamite Industries, Inc., Elmira, N. Y.
American Rolling Mill Co., Tulsa.
American Sand-Banum Co., Inc., New York.
Atlas Supply Co., Muskogee, Okla.
Automatic Valve Controller Co., Tulsa.

B

Baash-Ross Tool Co., Oklahoma City.
Bailey Meter Co., Cleveland, Ohio.
Baird Manufacturing Co., Tulsa.
Baker Oil Tools, Inc., Tulsa.
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Baroid Sales Co., Los Angeles.
Bastian Blessing Co., Chicago.
Beaver Pipe Tools, Warren, Ohio.
Big Three Welding Equipment Co., Tulsa.
Bovaird Supply Co., Tulsa.
Bridgeport Machine Co., Wichita, Kans.
Bristol Co., Waterbury, Conn.
Brodie, Ralph N., Co., Inc., Oakland, Calif.
Brown Instrument Co., Philadelphia, Pa.
Buda Company, Harvey, Ill.
Buda Engine Service of Tulsa, Tulsa.
Byron Jackson Co., Los Angeles.

C

Caterpillar Tractor Co., Peoria, Ill.
Central Forging Co., Catawissa, Pa.
Chain Belt Co., Milwaukee, Wis.
Chaplin-Fulton Manufacturing Co., Pittsburgh, Pa.
Chase Brass & Foundry Co.
Chicago Bridge & Iron Works, Tulsa.
Chicago Pneumatic Tool Co., Oklahoma City.
Coffing Hoist Co., Danville, Ill.
Concrete Surfacing Machinery Co., Cincinnati, Ohio.
Continental Supply Co., Dallas, Tex.
Cook, C. Lee, Manufacturing Co., Louisville, Ky.
Cooper, Fred E., Tulsa.
Cooper-Bessemer Corp., Mount Vernon, Ohio.
Crouse-Hinds Co., Syracuse, N. Y.

D

Darling Valve & Manufacturing Co., Williamsport, Pa.
Dearborn Chemical Co., Chicago.
Deep Rock Oil Corp., Tulsa.
Dowell, Inc., Midland, Mich.
Driftmeter, Inc., Tulsa.
Duff Norton Manufacturing Co., Pittsburgh, Pa.
Dura metallic Corp., Kalamazoo, Mich.

E

Economy Electric Lantern Co., Chicago.
Electric Supply Co., Tulsa.
Elliott Co., Jeannette, Pa.

F

Farrell-Birmingham Co., Inc., Buffalo, N. Y
Fisher Governor Co., Marshalltown, Iowa.
Foxboro Co., Foxboro, Mass.
France Packing Co., Philadelphia, Pa.
Frick-Reid Supply Co., Tulsa.

G

Gaylord, Robert, Inc., St. Louis.
Garlock Packing Co., Palmyra, N. Y.
Gaso Pump & Burner Manufacturing Co., Tulsa.
Gearench Manufacturing Co., Houston, Tex.
General Paint Corp., Tulsa.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Goodrich Electric Co., Chicago.
Grolier Society, The, Kansas City, Mo.
Guiberson Corp., Dallas, Tex.
Gulf Publishing Co., Houston, Tex.
Gustin-Bacon Manufacturing Co., Kansas City, Mo.

H

Halliburton Oil Well Cementing Co., Duncan, Okla.
Happy Belting Co., Tulsa.
Hanlon-Waters, Inc., Tulsa.
Hazard Wire Rope Co., Tulsa.
Hercules Motors Corp., Canton, Ohio.
Hercules Tool Co., Tulsa.
Hinderliter Tool Co., Tulsa.
Hough, The C. N., Manufacturing Co., Franklin, Pa.
Hughes Tool Co., Houston, Tex.
Hyatt Roller Bearing Co., Newark, N. J.

I

Ingersoll-Rand, Inc., Tulsa.
International Derrick & Equipment Co., Tulsa.
International Filter Co., Chicago.
International Harvester Co., Chicago.
International Nickel Co., Inc., New York.
Iverson Tool Co., Tulsa.

J

Jarecki Manufacturing Co., Tulsa.
Johnston & Jennings Co., Cleveland, Ohio.
Jones, S. M., Co., Tulsa.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Joyce Cridland Co., Dayton, Ohio.

K

Kerotest Manufacturing Co., Pittsburgh, Pa.
Key Co., East St. Louis, Ill.
Kidde & Co., Walter, New York.

L

Landis Machine Co., Waynesboro, Pa.
Lane-Wells Co., Oklahoma City.
Larkin Packer Co., St. Louis.
Leland Equipment Co., Tulsa.
Link-Belt Co., Chicago.
Louis Allis Co., Milwaukee, Wis.
Lucey Boiler & Manufacturing Corp., Chattanooga, Tenn.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lunkenheimer Co., Cincinnati, Ohio.

M

McCord Radiator & Manufacturing Co., Detroit, Mich.
Machine Tool & Supply Co., Tulsa.
Maloney Tank Co., Tulsa.
Manzell Bros. Co., Buffalo, N. Y.
Marathon Oil Co., Tulsa.
Mason-Neilan Regulator Co., Boston, Mass.
Metals Coating Co. of America, Philadelphia, Pa.
Mid-Continent Petroleum Corp., Tulsa.
Mid-Continent Supply Co., Tulsa.
Midwest Equitable Meter Co., Tulsa.
Mine Safety Appliances Co., Pittsburgh, Pa.
Mission Manufacturing Co., Houston, Tex.
Moore & Co., Lee C., Inc., Tulsa.
Moorlane Co., Tulsa.
Morrison Bros., Dubuque, Iowa.
Motor Improvements, Inc., Newark, N. J.
Muskogee Iron Works, Inc., Muskogee, Okla.

N

National Carbide Sales Corp., New York.
National Petroleum News, Tulsa.
National Supply Co., Tulsa.
National Tank Co., Tulsa.
Nelson Electric Supply Co., Tulsa.
New Deal Specialty Co., Inc., Okmulgee, Okla.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Norris, W. C., Tulsa.
Nugent & Co., Wm. W., Inc., Chicago.

O

Ohio Steel Foundry Co., Springfield, Ohio.
Oil and Gas Journal, The, Tulsa.
Oil Country Specialties, Coffeyville, Kans.
Oil Well Improvements Co., Tulsa.
Oil Well Supply Co., Dallas, Tex.
Oklahoma Steel Castings Co., Tulsa.
Oster-Williams, Cleveland, Ohio.

P

Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Petroleum Engineer, Dallas, Tex.
Petroleum Engineering, Inc., Tulsa.
Phillips Petroleum Co., Tulsa.
Pittsburgh Equitable Meter Co., Tulsa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Podbielniak Industrial Research & Eng. Lab., Chicago
Portable Rig Co., Inc., Houston, Tex.
Powell Co., The Wm., Cincinnati, Ohio.
Progressive Brass Manufacturing Co., Tulsa.
Pyrene Manufacturing Co., Newark, N. J.

Q

Quigley Co., New York.

R

Reading-Pratt & Cady Co., Inc., Bridgeport, Conn.
Rector Well Equipment Co., Fort Worth, Tex.
Red-Rex Corp., Houston, Tex.
Reed Roller Bit Co., Houston, Tex.
Refinery Supply Co., Tulsa.
Republic Steel Corp., Massillon, Ohio.
H. Rickman, Tulsa.
Ridge Tool Co., Elyria, Ohio.

S

Safety Equipment Service Co., Cleveland, Ohio.
Scintilla Magneto Co., Inc., Sidney, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
Seismograph Service Corp., Tulsa.
Shaffer Specialty Co., Tulsa.
Sherwin-Williams Co., Tulsa.
Sinclair Prairie Oil Co., Tulsa.
Skelly Oil Co., Tulsa.
S. K. F. Industries, Inc., Philadelphia, Pa.
Smith Separator Corp., Tulsa.
Sonner Burner Co., Winfield, Kans.
Southwest Box Co., Sand Springs, Okla.
Spang Chalfant & Co., Inc., Tulsa.
Sperry Sun-Well Surveying Co., Philadelphia, Pa.
Sullivan Machinery Co., Chicago.
Sun Oil Co., Philadelphia, Pa.
Surface Equipment Co., Tulsa.

T

Tagliabue Manufacturing Co., C. J., Brooklyn, N. Y.
Taylor Forge & Pipe Works, Chicago.
Taylor Instrument Companies, Rochester, N. Y.
Templeton, Kenly & Co., Ltd., Chicago.
Texas Co., Dallas, Tex.
Thompson Pump Co., Okmulgee, Okla.
Timken Roller Bearing Co., Canton, Ohio.
Timken Steel & Tube Co., Canton, Ohio.
Trimont Manufacturing Co., Inc., Roxbury, Mass.
Tulsa Rig & Reel Co., Tulsa.
Tulsa Rubber Products Co., Tulsa.
Twin Disc Clutch Co., Racine, Wis.

U

Union Carbide Co., New York.
Union Wire Rope Co., Kansas City, Mo.
Universal Engineering Co., Ltd., Los Angeles.

V

Vapor Recovery Systems Co., Compton, Calif.
Viking Pump Co., Cedar Falls, Iowa.
Vinson Co., B. W., Tulsa.
Vogt Machine Co., Henry, Louisville, Ky.
Vortox Manufacturing Co., Claremont, Calif.

W

Wackman Welded Ware Co., North Kansas City, Mo.
Walter O'Bannon Co., Tulsa.
Wall Rope Works, Inc., Tulsa.
Walworth Co., South Boston, Mass.
Waukesha Motor Co., Waukesha, Wis.
Webster Engineering Co., Tulsa.
Welders Supply Co., Tulsa.
Westcott & Greis, Inc., Tulsa.
Westinghouse Electric Mfg. Co., East Pittsburgh, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
Wickwire Spencer Steel Co., New York.
Wico Electric Co., Springfield, Mass.
Willard Storage Battery Co., Cleveland, Ohio.
Williams Bros. Well Treating Corp., Tulsa.
Wilson Bennett Manufacturing Co., Chicago.
Wilson Manufacturing Co., Wichita Falls, Tex.
Wilson Welder & Metals Co., New York.
W. K. M. Co., Inc., Houston, Tex.
Worthington Pump & Machinery Corp., Tulsa.

Y

Young Engine Corp., Canton, Ohio.

Z

Zink, John, Co., Tulsa.

WILDCAT OPERATIONS

OKLAHOMA WILDCATS

Week Ending November 9

NORTHERN OKLAHOMA

Alfalfa County

Marathon Oil Co.'s No. 1 Werner, NW NW SW Sec. 15-29-9w.
Location.

Tex-O-Kan Oil Co.'s No. 1 Acre, C SW NE Sec. 14-24-11w.
Drill pipe froze, at 6,600 ft. with 250 sackfuls, drlg. at 6,675 ft. in new hole.

Beaver County

Anderson & Kerr et al's No. 1 Davis, C SW SE Sec. 36-5-26 (Cimarron Meridian).
Drlg. 3,278 ft.

Beckham County

G. E. Martin's No. 1 Hood, C NE NW Sec. 7-8-23w.
Drlg. 2,202 ft.

Star Oil Co.'s No. 1 Blair, C NW SE Sec. 32-9-26w.
Rigging up.

Caddo County

Denver Prod. & Ref. Co.'s No. 1 Sah-Can. C SE SE Sec. 33-10-10w.
Drlg. 5,390 ft.

H. W. Lee et al's No. 1 Horton, NE cor. Sec. 9-6-13w.
T.D. 1,630 ft., waiting for sand line.

F. A. Turner et al's No. 1 Sapin, NE NE SW Sec. 1-5-11w.
T.D. 3,166 ft.; U.R. to 5-3/16-in. csg. to 3,113 ft.

Cleveland County

Asa Lee Mayes, Inc.'s No. 1 Parsons, SW SW SE Sec. 30-9-1.
Rigging up rotary.

Hall-Briscoe, Inc.'s No. 1 Fant, SW SW NE Sec. 27-10-2w.
Sylvan 7,038 ft., drlg. ahead.

Coal County

Carter Oil Co. et al's No. 1 Thompson, C S½ NE NW Sec. 34-2-9.
Drlg. 6,006 ft.

Southern Oil Co.'s No. 1 Fish, SW SW SW Sec 6-1s-8.
Drlg. 280 ft.

Comanche County

Oscar Jones' No. 1-A Scheets, NE SW Sec. 36-3-10w.
Rigged up.

F. B. Imboden et al's No. 1 Smith, SW cor. 12-2-10w.
Show of oil at 220-35 ft.

John Nicholas' No. 1 Householder, NE NE SW Sec. 8-2-10w.
S.D. 790 ft.

Geo. Pace et al's No. 1 Spencer, SW cor. SE Sec. 21-3-10w.
Drlg. 1,576 ft.

Garfield County

Ross Cummings et al's No. 1 Gage Est., SE NW Sec. 27-22-3w.
R.U. cable tools.

Herndon Drlg. Co. et al's No. 1 Whitaker, SE cor. Sec. 27-24-3w.
Drlg. 4,325 ft.

Earl McBride's No. 1 Gage, SE SE NW Sec. 27-22-3w.
Drlg. 1,810 ft.

Garvin County

Charles Carter and W. S. Key, Inc.'s No. 1 Wood, NW SW SE Sec. 5-4-3e.
S.D. 2,405 ft.

Suggett & McElreath's No. 1 Camp, NE NE SE Sec. 22-4-1w.
Drlg. 2,410 ft.

Grady County

Sayre Oil Co.'s No. 1 Anderson, NE SE SE Sec. 36-4-6w.
Drlg. 2,700 ft.

Grant County

Helmerich & Payne's No. 1 Crouse, C NE SW Sec. 29-25-8w.
Top Wilcox 6,615 ft.; T.D. 6,684 ft.; shot off pipe at 4,443 ft.; flowed mud and some oil; trying to pull casing.

Shell Pet. Corp.'s No. 1 Foster, NW SE Sec. 30-27-8w.
T.D. 5,962 ft., will standardize.

Wentz Oil Corp. et al's No. 1 Wirtz (Community), SE SE NW Sec. 22-28-4w.
Drlg. 4,618 ft.

Southern Oil Co. et al's No. 1 Allen, SW SE Sec. 36-26-4w.
T.D. 925 ft., cleaning out cave.

Greer County

H. N. Payne et al's No. 1 Tressell, NW cor. Sec. 1-7-22w.
T.D. 1,785 ft.; U.R. 8-in. csg.; to deepen; cleaning out.

Hughes County

Caprock Oil Co.'s No. 1 Parks, SW SW SE Sec. 34-7-8.
S.D. 366 ft.

Sivalls et al's No. 1 Montgomery, NW SW NW Sec. 7-9-9.
Drlg. 1,780 ft.

Texas Co.'s No. 1 Keaton, NW SW Sec. 4-8-10.
Set 5-in. csg. 3,950 ft.; shot 15 qts. 3,-985-4,038 ft.; acidized; 650 ft. oil and 1,-250 ft. water in hole; pulled 5-in. csg. and plugging back to 3,968 ft.; acidised with oil load, flowed 50 bbls. oil gross in one head, then "went dead."

Kay County

Helmerich & Payne's No. 1 Roth, SW SW SW Sec. 8-28-2w.
Rig.

A. D. Morton's No. 1 Warren, SE SE NW Sec. 19-29-4.
T.D. 1,600 ft.

Robinson Drlg. Co.'s No. 1 Hermes, SW SW NW Sec. 6-26-4.
Wilcox sand at 2,930-37 ft., show of water.

Kiowa County

Rajah Oil Co.'s No. 3 Stone, C SE NE Sec. 34-7-17w.
Salt water 1,480-1,547 ft., T.D.; plugged back to 1,050 ft.

Rogan Oil Co.'s No. 1 King, SE SE NW Sec. 11-6-15w.
Spudded 30 ft.

Leflore County

McCraw et al's No. 1 Tidwell, C NW SE Sec. 17-3-22.
Set 15-in. pipe 377 ft.

Lincoln County

W. N. Anthony's No. 1 Fruin-Eckman, SE SE SW Sec. 4-16-1e.
Rigging up standard tools; T.D. 5,181 ft.; bailed at 300 ft.; small show of oil and water; shut down.

M. W. Cozart's No. 1 Sekovaty, NE NE NW Sec. 14-14-3.
Cellar and pits.

J. Garfield Buell et al's No. 1 Seward. NE NW NE Sec. 25-14-3.
Prue sand 3,962 ft., drlg. 4,447 ft.

Fred McDuff's No. 1 Jacob, NE NE SE Sec. 10-15-3.
Cellar and pits.

Texas Co.'s No. 1 Vanderpool, NW SW SE Sec. 11-16-3.
Rigged up.

Logan County

Springrose Drlg. Co.'s No. 1 Cole (Harrison) SW SW NW Sec. 32-15-1.
Building rig and rigging up.

Stanolind O. & G. Co., Amerada Pet. Corp. and Eason O. & R. Co.'s No. 1 Gragg, SW SW NE Sec. 20-18-4w.
Set whipstock 4,965 ft.

Texas Co. et al's No. 1 Wood, SW SW NE Sec. 34-15-4w.
Correction: Hunton 6,549 ft.; T.D. 6,584 ft., odor of gas in core.

McIntosh County

Indian Ty. Ill. Oil Co.'s No. 1 Tancred. 1,050 ft. S and 390 ft. E of C. Sec. 9-9-14.
Rigging up cable tools.

Okfuskee County

W. J. Sherry et al's No. 1 Washington. SW SW NE Sec. 21-13-7.
Drlg. 2,160 ft.

Stanolind and Amerada's No. 1-A Washington, SE NE NE Sec. 12-13-7.
Location.

Sunray Oil Co.'s No. 1 Culia, NE SW NE Sec. 13-12-8.
Wilcox sands 4,165-80 ft., dry; 4,190-94 ft., T.D.; water, will plug back to 4,091 ft. and acidize.

Oklahoma County

Sinclair Prairie O. & G. Co.'s No. 1 Corbett, NE NW NE Sec. 17-13-3w.
Wilcox sand 6,545-6,706 ft.; plugged back to 6,524 ft.; flowed 72½ bbls. gasoline in 15 hrs.; estimated 6,000,000 to 8,000,-000 ft.; gas, hole bridged; trying to knock out bridge.

Osage County

J. A. Freeberg et al's No. 1, NE cor. SE Sec. 1-25-6.
Drlg. 2,075 ft.

Texas Co.'s No. 1, SW cor. SE Sec. 22-24-6.
Mississippi lime 2,834 ft.; T.D. 2,942 ft., acidized, with en 80 bbl. oil load; pumped 8½ bbls. oil in 90 min.; S.D.

Pawnee County

Stanolind Oil & Gas Co.'s No. 1 Dexter, NE SW SE Sec. 32-22-3. (Old well drilling deeper).
Cored 4,300-17 ft., recovered portion slightly stained; abd.

Pittsburg County

Vaughn Production Co. et al's No. 1 Chunn, 990 ft. N and 614 ft. W of C Sec. 29-4-14.
T.D. 1,560 ft.

Pontotoc County

Ada Petroleum Co.'s No. 1 Simmons, CWL NW NW Sec. 8-3-6.
Bromide 4,545 ft., sands 4,660 ft., and 4,747 ft.; drlg. 4,885 ft.

E. M. Blanchard's No. 1 Crabtree, NE SE NE Sec. 27-3-6.
S.D. 2,930 ft.

Continental Oil Co's No. 1 McCarty, C SE NW Sec. 12-1-7e.
McLish 4,427 ft.; T.D. 4,446 ft.; tools recovered; 15,000,000 ft. of gas and flowed about 2,000 bbls. oil and was shut in.

Delaney et al's No. 1 Fox, 1,337 ft. from N and 1,091 ft. from E lines of SE Sec. 2-1-7.
Cellar and Pits.

Franks Bros.' No. 1 Abbott, SW NW NE Sec. 34-3-6.
Rig.

Gypsy Oil Co.'s No. 1 Emry, SW SW NE Sec. 15-2-6.
Drlg. 3,206 ft.

McBride, Inc., et al's No. 1 Chester, SE SE NE Sec. 26-4-6.
Drlg. 190 ft.

McBride, Inc., et al's No. 1 Copeland, SE NW Sec. 31-4-5.
Viola 1,636 ft.; T.D. 1,950 ft.; sulphur water; underreaming 6-in. csg.

Orbit Oil Co.'s No. 1 Federal Land Bank, SE SW SW Sec. 10-4-3.
Drlg. 1,694 ft.

Southern Oil Co.'s No. 1 Perry SW SW NW Sec. 11-4-6
T.D. 2,741 ft.; S.D.

Pottawatomie County

Ross Oil Co. et al's No. 1 Sparkman, SE NE Sec. 32-8n-4e.
Drlg. 2,972 ft.

Seminole County

L. Cooper's No. 1 Chandler, NE SE SW Sec. 4-5-6.
S.D. 1,780 ft.

Deep Rock Oil Co.'s No. 1 Robert, SW NW NW Sec. 32-9-5.
Sylvan 4,435 ft., drlg.

Texas County

Cabot Carbon Co.'s No. 1 Mathews, C NW Sec. 3-3-15 (Cimarron Meridian).
3,500,000 ft. gas 2,675-80 ft.; T.D. 2,680 ft.; fishing for tools.

Washita County

L. P. McWhirter's No. 1 fee, SW cor. Sec. 24-8n-19w.
T.D. 1,102 ft., cleaning out.

SOUTHERN OKLAHOMA

Atoka County

L. O. Garner et al's No. 1 Garner, C NE NW NE Sec. 27-1n-15 (300-ft. test).
S.D. 825 ft.

Malarnee et al's No. 2 D.O.K. land, C SE SE Sec. 35-2s-13.
T.D. (corrected) 3,136 ft.; cleaning out.

Mid-Continent Pet. Corp. et al's No. 1 Fulton, SW cor. Sec. 19-1s-12e.
T.D. 3,005 ft. in Atoka; tools moved out.

R. H. Pierce et al's No. 1 Aetna Life Ins. Co., NW SW NE Sec. 10-1n-13e.
Drlg. 2,220 ft.

A. J. Sanders' No. 1 Redden, NE SW SW Sec. 19-1n-15e.
Drlg. 220 ft.

Vierson et al's No. 1 Williams, NE SW NW Sec. 34-2s-10.
T.D. 2,575 ft.; U.R. 8-in. csg.

Bryan County

H. B. Smith et al's No. 1 Henry, C NW NE Sec. 10-8s-7e.
T.D. 288 ft., cleaning out.

Carter County

Carter Oil Co.'s No. 1 Carter-Williams. SW NE SW Sec. 27-2s-3w.
T.D. 3,033 ft., flowed 10,000 bbls. of oil in 24 hrs.; trying to kill production and run csg.

Louis Sikes' No. 1 Byrd, SW SE SW Sec. 4-2s-2w.
T.D. 1,727 ft.; will test.

Choctaw County

Rhodes et al's No. 1 Possumik Savings Bank, SW NW Sec. 1-5s-17.
Fishing tools at 605 ft.

Comanche County

George Pace et al's No. 1 Spencer, SW SW SE Sec. 21-3-10w.
Set 12½-in. pipe 70 ft.

Imbodin et al's No. 1 Woods, SE SW SE Sec. 27-2-10w.
Pits.

F. F. Stevens' No. 1 Green, SE SE SW Sec. 2-1n-12w.
Fishing for tools 1,893 ft.

Jackson County

Associated Oil Co.'s No. 1 Harrell, NE NE SE Sec. 13-1s-21w.
S.D. 1,940 ft.

Gypsy Oil Co.'s No. 1 Stokes, SE NW SW Sec. 11-1-20w.
Lime 1,709-11 ft.; T.D. 1,722 ft.; S.D.

Jefferson County

M. H. Barrett's No. 1 Mose, C N½ NW SW Sec. 9-6s-7w.
Drlg. 300 ft.

Gypsy Oil Co.'s No. 1 James, SW SE SE Sec. 30-6s-6w.
S.D. 2,102 ft.

Johnston County

Equitable O. & G. Co.'s No. 1 Bellsey, NE SW Sec. 12-2s-4e.
Drlg. 701 ft.

Godfrey & Neff's No. 1 Everets, NE cor. SE SW SW Sec. 20-4s-6.
Drlg. 150 ft.

Moore & Wirick's No. 1 Westheimer & Daube, SE NW NE Sec. 19-3s-4e.
Rigging up.

Neff & Godfrey's No. 1 Merrell, 820 ft. N, 670 ft. W SE cor. Sec. 28-4s-6e.
Drlg. 510 ft.

Love County

Amerada Pet. Corp.'s No. 1-A Westheimer & Daube, SW SE SW Sec. 27-6s-2e.
Drlg. 1,870 ft.

Sinclair Prairie Oil Co.'s No. 1 Stockton, SE SE SW Sec. 26-6s-2w.
Drlg. 6,427 ft.

Marshall County

M. H. Barrett's No. 1 Mose, C N½ NW SW Sec. 9-6s-7w.
Drlg. 715 ft.

Jess Cook et al's No. 1 May, NE NW Sec. 12-8s-5.
Drlg. 75 ft.

Norman Smith's No. 1 Chestnut, NE cor. Sec. 23-8s-5e.
S.D. 275 ft.

Paul Robb's No. 1 Vittetoe, C NE SE Sec. 11-5s-4e.
Top Sylvan shale 5,405 ft.; T.D. 5,461 ft.; S.D.

Selby Oil & Gas Co.'s No. 2 Gilbert, SE cor. SW NE SW Sec. 25-8s-7e.
Drlg. 130 ft.

Pushmataha County

C. W. Whitehead et al's No. 1 Misser, SE SW SW Sec. 35-3s-18e.
Drlg. 3,480 ft.

Stephens County

Franklin & Duncan's No. 1 Woolsey, NW NW SE Sec. 10-3s-4w (old well deepening).
T.D. 1,050 ft.; pulled rig in.

Prince Bros.' No. 1-A Williams, C SW SE Sec. 19-2-8w.
Drlg. 1,724 ft.

Shasta Oil Co.'s No. 1 Fuqua, NE NW NW Sec. 13-1s-7w.
T.D. 1,125 ft.

Tillman County

J. B. Connelly's No. 1 McCord, NW SE NE Sec. 15-1-17w.
T.D. 665 ft.

Gypsy Oil Co.'s No. 1 Schenck, SE NW SE Sec. 31-1s-18w.
Drlg. 1,800 ft.

Loper et al's No. 1 Conrad, NE cor. Sec. 35-1s-19w.
Drlg. in brown shale 1,660 ft.

KANSAS WILDCATS

Week Ending November 9

(Descriptions are East unless marked otherwise)

Barton County

Lario O. & G. Co. et al's No. 1 Peter, NW cor. Sec. 24-20-11w.
Siliceous 3,273-91 ft.; pumped 205 bbls. in 12 hrs.; acidized; potential 995 bbls. in 17 hrs.; completed.

Lario O. & G. Co. et al's No. 1 Smith. SW NW NW Sec. 26-18-13w.
T.D. 705 ft.

Murphy & Morgan's No. 1 Robinson, NE NE SW Sec. 21-16-14w.
Cellar and ponds.

Suppes & Witt's No. 1 Hayes, NW cor Sec. 7-16-15w.
Drlg. 3,470 ft.

Torry & Feaster's No. 1 Feist, NE NE SE Sec. 29-18-11w.
Siliceous lime 3,430-32½ ft., T.D.; pumped 435 bbls. in 18 hrs., net.

W. E. Witt's No. 1 Murry, NW NW SW Sec. 14-17-14w.
Drlg. 385 ft.

Butler County

Western Kansas O. & R. Co.'s No. 1 King & Marshall, NW NW SW Sec. 11-28-6.
Siliceous lime 3,044-49 ft.; acidized; pumped 590 bbls. oil in 48 hrs.

Cowley County

E. B. Shawver et al's No. 1 Hanna, NE NW SE Sec. 29-30-3.
Dry and abd. 3,310 ft.

T. C. Johnson's No. 1-A Ferguson, NW SW SE Sec. 17-20-8.
Show of oil at 2,150-68 ft.; U.R. 8-in. csg.

Wakefield et al's No. 1 Auman, SE SE NE Sec. 32-23-3.
Chat 3,338 ft.; 100 ft. oil in hole; water at 3,348 ft.; P.B. to 3,338 ft.; shot 30 qts. and swabbed 15 bbls. oil and 7 bbls. water in 8 hours; completed.

Earl Wakefield's No. 1 Hanna, NE NE SW Sec. 2-21-4.
S.D. 2,660 ft.

Winkler, Koch et al's No. 1-B Harlan, C NW NE Sec. 13-21-7.
Shut down 1,400 ft.

Dickinson County

Dutch Oil Co.'s No. 1 Phillips, C NE NW Sec. 15-15-1e.
Drlg. 3,870 ft.

Ellis County

Helmerich & Payne et al's No. 1 Kuhn, C NE quarter Sec. 16-14-20w.
Lamotte sand 3,897 ft.; fishing at 3,-900 ft.; moving in rotary tools.

P. G. Reynolds et al's No. 1 Walter, SE NE SW Sec. 2-12-18w.
Moving in material.

Twin Drlg. Co.'s No. 1 Goetz, SW SW SE Sec. 3-14-17w.
Drlg. 1,590 ft.

Ellsworth County

Empire Oil & Refining Co.'s No. 1 Dolchek, SW cor. sec. 7-16-7w.
Rig.

Gypsy Oil Co. and Texas Co.'s No. 1 Lapham, SW cor. Sec. 27-16-7w.
Dry and abd. 3,077 ft.

Tom Palmer's No. 1 Splitter, NW NE SE Sec. 17-17-8w.
Cleaning out 3,215 ft.

Slick, Pryor & Lockhart's No. 1 Sturn, NW NW SW Sec. 26-17-10w.
Drlg. 1,375 ft.

Graham County

Cusco Oil Co.'s No. 1 Kaufman, C NE NE Sec. 18-6-24w.
Rigging up.

Vickers Pet. Co. & Phillips Pet. Co.'s No. 1 Hutton, 430 ft. W and 330 ft. S of NE SE Sec. 29-8-22w.
Cleaning out 828 ft.

Grant County

Piney Oil & Gas Co.'s No. 1 Kennedy, C SW¼ Sec. 10-29-36w.
Drlg. 1,955 ft.

Greenwood County

Ward McGinnis' No. 1 Crawford, C NE SE sec. 8-28-12.
Shut down 1,104 ft.

Harvey County

Ok-Tex Oil Co.'s No. 1 Osborne, C SE SE sec. 6-23-3w.
Drlg. 337 ft.

Haskell County

Helmerich & Payne's No. 1 Elliott, C SW Sec. 30-29-33w.
Drlg. well for drilling water.

Kingman County

D. R. Lauck's No. 1 Skilling, SE NE SW Sec. 33-27-8w.
Rigging up cable tools 4,022 ft.

Logan County

Alma Pet. Co. and McNeely's No. 1 Watchorn, C SW NE Sec. 13-15-33w.
LaMotte 5,560 ft.; Granite Wash 5,660 ft.; T.D. 5,756 ft.; plugged back to 3,-800 ft.; ran 5-in. csg.

McPherson County

Whan et al's No. 1 Stromquist, SW SE SE Sec. 2-19-3w.
U.R. 2,397 ft. to 2,397 ft.

Norton County

Lario O. & G. Co. and Elwell's No. 1 Kennedy, SW SW NW Sec. 22-3-23w.
Rigging up.

Pratt County

Shelly Oil Co. et al's No. 1 Comm. Gilchrist, C SE¼ Sec. 7-28-11w.
Cleaning out 3,910 ft.

Reno County

Dawe & Dustin's No. 1 Ghormley, C NE NW Sec. 17-24-7w.
Spudded and shut down.

Foraker et al's No. 1 Hiett, SE SW NE Sec. 24-24-4w.
U.R. 12-in. csg. to 1,485 ft.

Shell Pet. Corp.'s No. 1 Reese, center W½ W½ SW¼ Sec. 11-26-9w.
Viola 4,128 ft.; flowed 378 bbls. in 24 hrs.; set 8-in. csg. 4,135 ft.; T.D. 4,-156 ft.

Stanolind & Amerada's No. 1 J. J. Hilger, A, NE NE SW Sec. 21-26-4w.
Dry and abd. 4,194 ft.

Winkler & Koch et al's No. 1 Brownlee, C NW SW Sec. 31-24-10w.
Drlg. 2,470 ft.

Rice County

Day's No. 1 Mason, NW NE NE Sec. 28-21-7w.
S.D. 2,690 ft.

Detrick et al's No. 1 Monroe C NE NE Sec. 9-20-7w.
T.D. 975 ft.

Empire O. & R. Co.'s No. 1 Schroeder, SW SE SE Sec. 7-18-9w.
Drlg. 2,535 ft.

Detrick et al's No. 1 Conner, C NE NE Sec. 28-19-7w.
Drlg. 2,720 ft.

Rooks County

El Dorado Refining Co.'s No. 1 Marshall, C SE SE Sec. 8-7-17w.
Oswald 2,997 ft.; drlg. 2,060 ft.

F. A. Gillespie & Sons' No. 1 Low, NE NE NW Sec. 12-6-18w.
T.D. 1,516 ft.; fishing.

Murfin et al's No. 1 Wasthusin, NE NE SE Sec. 19-9-16w.
S.D. 1,300 ft.

Rush County

E. L. Byers et al's No. 1 Ewing, NW SW SW Sec. 35-19-15w.
Bldg. rig.

Ramsey Pet. Co. et al's No. 1 Darkes, C W½ W½ NW Sec. 5-17-20w.
Simpson 4,090 ft.; 400 ft. water in hole at 4,096-98; U.R. 5-in. csg.

Russell County

Central Pet. Co.'s No. 1 Boxberger, NW cor. Sec. 36-15-15w.
Ran 8-in. csg. to 2,345 ft.

Coralena Oil Co.'s No. 1 Berrick, NE NW NE Sec. 6-15-13w.
Oswald 2,894-2,928 ft.; swabbed 65 bbls. oil in 6 hrs.; water 3,219-20 ft.; plugged back to 2,918 ft.; shot with 40 qts.

L. D. Davidson et al's No. 1 P. Polcyn, SE SW NW Sec. 6-14-15w.
Rig.

T. C. Johnson et al's No. 1 Mermis, NE NE SW Sec. 29-13-15w.
Oswald 3,068 ft.; T.D. 3,154 ft.; U.R. 6-in. csg.

Sam Murphy et al's No. 1 Enschutz & Schaffer, SW cor. Sec. 10-15-13w.
Rigging up.

Murfin et al's No. 1 Gorham estate, NE NE SE Sec. 29-14-15w.
Drlg. 1,580 ft.

Phillips Petroleum Co. and Sinclair Prairie Oil Co.'s No. 1 Driscoll, NW NW SE sec. 31-15-11w.
Rig.

Sedgwick County

Derby et al's No. 1 Bartholomew, SW NW NW Sec. 3-27-4w.
Siliceous 4,137 ft.; T.D. 4,155 ft.; water; P.B. 4,006 ft. and drilled to 4,017 ft.; acidized; no test.

Dickey Oil Co.'s No. 1 Wilbur, SW cor. 15-27-1w.
Spudded.

Dickey Oil Co. et al's No. 1 Chase, SE cor. Sec. 11-27-2.
Siliceous 3,262-79 ft.; pumped 50 bbls. oil, 60 bbls. water; cementing above pay.

Stafford County

Atlantic Oil Producing Co., Phillips Petroleum Co. et al's No. 1 Brown C NW NE Sec. 16-23-13w.
Siliceous lime 3,900 ft.; water at 3,-919½; T.D. 3,940 ft.; plugged back to 3,750 ft.

Sumner County

Orcutt & Stewart's No. 1 Newton, SE cor. Sec. 21-30-2.
Spudded.

C. Pulse's No. 1 Buss, NW cor. Sec. 12-33-2.
Drlg. 1,125 ft.

D. J. Wilson et al's No. 1 Clark, 1,320 ft. from W and 25 ft. from S line of NW Sec. 15-35-1w.
Sand 2,538-40 ft., show of oil and gas.

Winkler & Koch et al's No. 1 Belsley, SW SW NW Sec. 2-32-2w.
Viola 4,261 ft.; drlg. 4,266 ft.

Trego County

Central Commercial's No. 1 Wagg, NW NW SE Sec. 17-13-21w.
U.R. 12-in. csg. to 1,158 ft.

Hansa & Lauck and Olson Drlg. Co.'s No. 1 Lang, SE SE NW Sec. 1-14-21w.
Hole full water 3,917-20 ft.; drlg. 3,-992 ft.

Vickers et al's No. 1 Secor, NW NW NW Sec. 25-15-24w.
Siliceous lime 4,405 ft.; 400 ft. water in hole at 4,463 ft.

Woodson County

Coulter, Davidson et al's No. 1 Parke, NW cor. NE Sec. 25-25-13.
Cleaning out 1,454 ft.

LA.-ARK. WILDCATS

(Rotary operations unless otherwise designated)

NORTH LOUISIANA

Bossier Parish

Ark.-La. Gas Co.'s No. 1-B Werner, 1,258 ft. N, 624 ft. E, SW cor. SE SE Sec. 7-17-11.
Set 13⅜-in. 229 ft.; drlg. 527 ft.

Bossier O. & G. Co.'s No. 2 Sherrill, 330 ft. N and W, SE cor. Sec. 13-19-12.
S.D. 2,180 ft.

V. M. Miller's No. 1 Curtis Plant, Sec. 19-17-12.
S.W. and abd. 865 ft.

Premier Investment Co.'s No. 2 Larkin, 660 ft. N and 150 ft. E SW cor. Sec. 14-19-11.
Set 8-in. 94 ft.; set 6-in. 384 ft.; W.O.
S.R. 406 ft.

Producers O. & G. Co.'s No. 1 Pettitt, 330 ft. S and W, NE cor. NW Sec. 17-17-11.
Reaming in hard lime 3,435 ft.

Producers O. & G. Co.'s No. 1 Edwards, 660 ft. N and W, SE cor. Sec. 27-18-11.
S.D. for fuel 860 ft.

Triangle Drlg. Co.'s No. 3 Skannal, Unit 50, S and W of C of NE.
Drlg. 1,100 ft.

Caddo Parish

J. Ed Bailey, tr.'s No. 1 Hartzo, NW cor. NE NW Sec. 28-22-16.
S.D. 1,236 ft.

John D. Bialock's No. 2-A Seybert, 270 ft. N and 320 ft. E of C Sec. 17-20-15.
S.D. 1,500 ft.

J. M. Collins' No. 1 fee, 2,042 ft. N, 394 ft. E, SW cor. Sec. 4-20-15.
W.O.S.R. 2,196 ft.

The Hunter Co.'s No. 1 fee, 330 ft. N and E SW cor. SW SE Sec. 17-19-14.
Set 10-in. 84 ft.; set 6-in. 2,400 ft.

F. D. Hyde's No. 1 Thigpen & Herold, 350 ft. S and E, C Sec. 5-15-15.
Drlg. 1,920 ft.

A. D. King, tr.'s No. 1 Roach, 641 ft. E. 375 ft. N, SW cor. SE Sec. 4-14-16.
Dry and abd. 2,712 ft.

Max Brandt's No. 1 Hughes, SW cor. NE NW Sec. 15-20-15.
Tested 500,000 ft. gas; S.D.; W.O. 2,206 ft.

Poindexter & Tucker's No. 4 Levy, SW cor. SE NE Sec. 16-20-15.
Set 10-in. 55 ft.; set 6-in. 2,178 ft.

Puritan Oil Co.'s No. 1 Land, 550 ft. E, 250 ft. N, SW cor. Sec. 4-20-15.
W.O.S.R. 2,181 ft.

Shreveport Oil Corp.'s No. 7-B Muslow, 495 ft. N, 1,320 ft. E, SW cor. Sec. 4-20-15.
Drlg. 2,002 ft.

Shreveport Oil Corp.'s No. 2-G Muslow, 780 ft. S, 578 ft. W, NE cor. NW Sec. 9-20-15.
W.O.S.R. 2,185 ft.

The Leonard Co.'s No. 3-G Muslow, 660 ft. N, 500 W, SE cor. NW Sec. 17-20-15.
Comp., 500,000 ft. gas 821 ft.

Ty-Stan, Inc.'s No. 1 Jolly, 400 ft. S and E, NW cor. SW SW Sec. 22-22-15.
S.D. 2,820 ft.

Caldwell Parish

Caldwell Drlg. Co.'s No. 2 Gore, 280 ft. S, 600 ft. W, NE cor. SE Sec. 30-12-3e.
S.D.; W.O. 768 ft.

Critchett & Woods' No. 1 Kyles, NE cor. SW NE Sec. 18-11-3e.
Whipstocking 1,690 ft.; old T.D. 1,740 ft.

G. W. Zeigan et al's No. 1 La.-Central Lbr. Co., 175 ft. S and E, NW cor. SW SW Sec. 25-12-3e.
S.D. 1,200 ft.

Catahoula Parish

McIntyre et al's No. 1 Tensas, 1,740 ft. S, 990 ft. E, NW cor. Sec. 18-10-4e.
Arrng. to make drill stem test 2,810 ft.

Claiborne Parish

J. H. Lester's No. 1 Green, 330 ft. S and W of NE cor. NE NW Sec. 18-21-6.
Dry and abandoned 3,384 ft.

E. T. Oakes' No. 1 H. W. Patton Est., 660 ft. S and W, NE cor. Sec. 1-20-5w.
Drlg. 4,132 ft.

Ryan Oil Corp.'s No. 1 F. A. Gladney, 660 ft. S, 330 ft. E, NW cor. SE Sec. 10-23-16.
Sec. 27-20-7.
S.D. 3,832 ft.

United Gas Public Service Co.'s No. 2 Durrett, 660 ft. N and 1,980 ft. E, SW cor. Sec. 31-20-5.
Rigging up.

De Soto Parish

E. B. Bird et al's No. 1 J. H. Johns, 330 ft. N and W, C Sec. 20-14-6.
Tested S.W. 2,622 ft., S.D.W.O.

Century Drlg. Co.'s No. 1 D. Bailey, 440 ft. S and W C Sec. 25-11-14.
Coring 2,917 ft.

Sam Goldman's No. 1 G. R. Stell, 330 ft. S and W, NE cor. Sec. 5-12-14.
S.D. 200 ft.

Jai Drlg. Co.'s No. 1-A Scales, 330 ft. N and E, SW cor. SE SE Sec. 35-13-12.
Drlg. 2,440 ft.

Leslie Prod. Co.'s No. 1 Ramsey, 150 ft. N and W of C Sec. 36-11-11.
Abd.; will not drill.

C. T. Ruffin's No. 2 Lee, 150 ft. N, 660 ft. E, SW cor. NW SW Sec. 33-14-13.
W.O.S.R. 2,842 ft.

Ed Saffold et al's No. 1 Thigpen, Sec. 33-13-13.
O.W.D.D.; S.D. 1,940 ft.

Union Pet. Co.'s No. 1 Hill, Sec. 3-10-13.
Drlg. 1,935 ft.

Grant Parish

Alexander et al's No. 1 Maxwell, Sec. 9-9-1e.
S.D. 1,220 ft.

Lincoln Parish

Caldwell Land & Timber Co.'s No. 1 J. K. Hammons, 330 ft. S and E, NW cor. SE SW Sec. 30-18-1w.
Derrick.

Herman L. Brown's No. 1 Monstead, 1,-320 ft. S, 660 ft. E of C Sec. 10-17-4w.
Set 7-in. 5,270 ft.; T.D. 5,301 ft.

Madison Parish

Southern Land & Exploration Co.'s No. 1 Delta Land Co., Sec. 1-17-12e.
Set 8⅝-in. 2,106 ft.; T.D. 2,207 ft.

Morehouse Parish

United Gas Public Service Co.'s No. 31 Crossett, 1,320 ft. S, 660 ft. E, SW cor. Sec. 15-21-4e.
Rigging up.

United Gas Public Service Co.'s No. 16 Tensas, 1,320 ft. N, 660 ft. E, SW cor. Sec. 10-21-4e.
Set 6⅝-in. 2,092 ft.

Zeiger & Bacon's No. 2 Crossett Lbr. Co., 2,970 ft. N, 505 ft. E, SE cor. SE SW of Sec. 36, in Sec. 41.
S.D. 50 ft.

Ouachita Parish

American Liberty Oil Co.'s No. 1 Golson, C NW Sec. 25-17-1e.
Set 5½-in. 5,200 ft.; T.D. 5,281 ft.

Carbon Consolidated's No. 6 Feazel, 2,310 ft. N and 760 ft. W of center Sec. 25-19-3E.
Set 6-in. 2,144 ft.

Inabnet & Piper's No. 2 D'Arbone, 660 ft. S and W, NE cor. Sec. 28-19-3e.
Set 8⅛-in. 2,161 ft.

Inabet & Piper's No. 2 Douglas, 376 ft. S, 587 ft. W, NE cor. NW Sec. 31-19-4e.
Set 6-in. 2,145 ft.

Interstate Nat. Gas Co.'s No. 42 fee, 350 ft. S of NW cor. NE NE Sec. 24-19-3e.
Drlg. 1,900 ft.

Interstate Nat. as Co.'s No. 40 fee, 475 ft. S and 396 ft. E of NW cor. SE Sec. 30-19-4e.
Set 12½-in. csg. 172 ft.; set 8-in. 759 ft.

Rapides Parish

Amerada Pet. Co.'s No. 1 Weil, 2,450 ft. N. 550 ft. E. SW cor. Sec. 53-1s-2e.
Drlg. 6,739 ft.

Natchitoches Parish

Ab Jones' No. 1 Brown Lbr. Co., 400 ft N, 330 ft. W, SE cor. Sec. 5-10-10.
S.D. 1,023 ft.

Union Petroleum Co.'s No. 1 DeBlieux, 1,395 ft. E, 150 ft. S, NW cor. Sec. 33-10-7.
Drlg. 1,331 ft.

Red River Parish

India Oil Co.'s No. 1 La. Pecan Co., 2,590 ft. W and 850 ft. N of SE cor. Sec. 27-13-11.
Drlg. 500 ft.

J. S. Tuffree's No. 1 Wilkinson, 1,320 ft S and W, NE cor. Sec. 11-13-11.
S.D. 1,395 ft.

Sabine Parish

B. S. & M. Oil Co.'s No. 1 Tatum, 330 ft S and E, NW cor. NW SE Sec. 32-8-15
P.B. to 1,590 ft. from 2,160 ft.

Jack Lent's No. 1 Williams, Sec. 13-7-11
Tested, show oil 2,675 ft.

Geo. L. Pace's No. 4 DeSoto Corp., 330 ft. S and W NE cor. SE SE Sec. 27-10-12.
P.B. to 1,918 ft.; using acid.

Pearl Oil Corp.'s No. 5 M. Cranford, Sec. 20-9-13.
Rigging up.

Lee Whitehurst's No. 5 Frost Lbr. Ind., C NW SW SE Sec. 20-9-13.
Set 6-in. 1,510 ft.; testing 1,640 ft.

Lee Whitehurst's No. 4 Frost Lbr. Ind., 660 ft. N and 330 ft. E of SW cor. Sec. 20-9-13.
Comp., flowing 425 bbls. 2,069 ft.

Union Parish

Nemours Corp.'s No. 2 G. W. Haile, 660 ft. S and E, NW cor. Sec. 1-21-3e.
Comp. 250,000 ft. gas 2,190 ft.

Webster Parish

Bennett & Eldred's No. 1 Fulbright. NE NE Sec. 1-18-10.
S.D. for drill stem 2,310 ft.

Winn Parish

Parsons et al's No. 1 Tremont Lbr. Co., 660 ft. S, 330 ft. E NW cor. SW Sec. 10-12-2w.
S.D. 1,120 ft.

ARKANSAS

Arkansas County

Grand Prairie Realty Co.'s No. 2 Fischer, 412 ft. S, 12 ft. W, NE cor. NW NW Sec. 6-6-4w.
T.A. 1,625 ft.

Ashley County

Benedum & Trees' No. 1 Holmes, C NE SW Sec. 4-17-5.
Drlg. 3,766 ft.

Texas Seaboard Oil Co.'s No. 1 Bynum, 330 ft. N and W SE cor. SW NW Sec.
Dry and abd. 2,465 ft.

Columbia County

J. G. Cubage et al's No. 1 Rhea, 150 ft. N line, 330 ft. E, SW cor. SE SE Sec. 12-17-22.
S.D. 3,506 ft.

Southern States Gas Co.'s No. 1 Piney Woods Lbr. Co., 330 ft. N and E, SW cor. NE NW Sec. 10-20-22.
S.D. 1,924 ft.

Dallas County

McCall & Kelly's No. 1 Ray Owen, 336 ft. S and E, NW cor. NW SW.
S.D. 1,456 ft.

Hempstead County

G. L. Glass, tr.'s No. 1 May B. O'Bier, Sec. 32-12-23.
Derrick.

F. W. Martin's No. 2 Lafferty, C NW Sec. 17-14-24.
Rigging up.

LaFayette County

Earl F. Fox' No. 2 Coleman Bros., NE NE Sec. 30-16-24.
Set 10-in. 135 ft.

Kamon & Neely's No. 1 Cockran, NW cor. SE SW Sec. 26-19-25.
S.D. 4,450 ft.

Joe Modisett's No. 1 Red River Lbr. Co., C SW SW Sec. 21-19-14.
Drlg. 4,890 ft.

Riggs Bros.' No. 1 Dubose, SE cor. SW NW Sec. 35-15-24.
S.D. 2,800 ft.

Transportation Pet. Co.'s No. 1 Cockran, 300 ft. S and W, NE cor. SE Sec. 26-19-25.
S.D.; W.O. 3,345 ft.

Miller County

E. J. Donohue's No. 4 Beck, 330 ft. N

and W. SE cor. NE SE Sec. 33-15-26.
Set 10-in. 100 ft.

M. D. K. Fitzwater's No. 1 E. H. Beck. 150 ft. N and E, SW cor. NW SW Sec. 34-15-26.
W.O.S.R. 2,919 ft.

C. W. Hayes' No. 1 State, 316 ft. E and 200 ft. N of SW cor. SE NE Sec. 31-15-25.
S.W. and abd. 3,010 ft.

King Oil Corp.'s No. 1 G. W. Crank, SW NE Sec. 19-16-25.
Coring 3,073 ft.

C. V. Lenz's No. 1 A. Dean, NW cor. SE Sec. 24-15-26.
Coring 2,830 ft.

M. H. S. Oil Co.'s No. 2 Beck, Sec. 34-15-26.
Set 10-in. 120 ft.; drlg. 360 ft.

L. H. Mahon et al's No. 1 Miller Land & Timber Co., SW cor. SE Sec. 29-18-27.
S.D. 150 ft.

Nevada County

Carnett et al's No. 1 Floyd Munin, C SW Sec. 16-14-22.
S.D. 50 ft.

Ouachita County

Benedum & Trees' No. 1 H. Brighton, C NE SW Sec. 29-14-19.
Drlg. 3,800 ft.

Snow-Black Pet. Co.'s No. 1 Bedford, 680 ft. N and 150 ft. E, SW cor. Sec. 32-11-18.
Derrick up on new hole.

W. B. Street, trustee's No. 1 Roth & Cartier, 330 ft. N and E, SW cor. SW NE.
Set 12-in. 42 ft.

Poinsett County

Rockwell Dev. Co.'s No. 1 W. A. Smith, NE NE Sec. 13-11n-3e.
Reaming to bottom 2,410 ft.

Sevier County

Pendleton & Vaughn's No. 1 Dierke, C NW NE Sec. 14-10-29.
S.D. rep. rig 100 ft.

Union County

Arkansas Southern Oil Co.'s No. 1 F. R. Laney, Sec. 30-19-16.
Installing larger rig 175 ft.

J. C. Buckbee, Tr.'s No. 1 Sloan, 330 ft. N and E, SW cor. SE NW.
P.B. to 2,160 ft.

J. E. Crosbie Inc.'s No. 1 Sullivant, 200 ft. N and W SE cor. SW NW Sec. 12-17-14.
Junked hole; skidding over and set 10-in. 190 ft.; drlg. 275 ft.

Mrs. R. K. Jones et al's No. 1 Davis, 330 ft. N and W, SE cor. NW NW Sec. 28-16-14.
Arranging to test 3,297 ft.

O. O. Murphy, trustee's No. 1 L. Jones, 330 ft. N and W, SE cor. SE NW Sec. 12-19-12.
S.D. for water 150 ft.

MISSISSIPPI

Bolivar County

White & Jones' No. 1 Ballou, SE SE NW Sec. 17-24n-7w.
S.D. 1,614 ft.

Clarke County

L. Beckwith et al's No. 1 Long Bell Lbr. Co., 538 ft. S, 125 ft. W of C Sec. 10-3n-16e.
T.A.; lack of funds.

Clarke County Oil Co.'s No. 1 Dora Butler, C SW SW Sec. 15-2n-16e.
Set 10-in. 63 ft.

Greene County

United Gas Pub. Ser. Co.'s No. 1 William Unit, 200 ft. N, 100 ft. W, C SW Sec. 6-15-5w.
Drlg. 2,550 ft.

Harrison County

Big Ridge Oil Co.'s No. 1 Hinzin, NE Sec. 13-7s-10w.
S.D.; W.O. 1,100 ft.

Lafayette County

W. L. Stewart et al's No. 1 Russell, 1,320 ft. N, 1,720 ft. E, SW cor. Sec. 9-10s-1w.
Drlg. 2,670 ft.

Lauderdale County

Bob Dalton's No. 1 Bounds, Sec. 34-7n-15e.
S.D.; W.O. 1,600 ft.

Warren County

H. W. Elliott et al's No. 2 R. L. Parker, 780 ft. E, 1,570 ft. S, NW cor. Sec. 14-14n-1e.
S.D.; W.O. 1,600 ft.

Washington County

Perkins & Dees' No. 1 Lee, 1,500 ft. E, 500 ft. N, SW cor. Sec. 33-15n-3w.
S.D. 2,175 ft.

Winston County

Jack Vale et al's No. 1 Moody, 712 ft. N, 667 ft. E, SW cor. NW SW Sec. 3-13n-14e.
Set 6-in. 2,212 ft.

ALABAMA

Houston County

Rice O. & G. Co.'s No. 1 Oakley Est., SE cor. NW SW Sec. 9-3n-29e.
S.D. 3,625 ft.

Lamar County

DeSoto O. & G. Corp.'s No. 1 Gardner, Sec. 22-15s-16w.
Drlg. 4,705 ft.

Mobile County

J. C. Prine's No. 1 C. H. M. King, N½ NE Sec. 4-1n-4w.
Drlg. 2,599 ft.

FLORIDA

Lake County

Oil Dev. Co. of Florida's No. 1 South Lake, SE SE Sec. 17-24s-25e.
S.D. at 1,946 ft. after coring 75 ft. of lime; awaiting acid treatment.

LA.-ARK. PROVEN
NORTH LOUISIANA

Caddo—Rodessa

Ark.-La. Gas Co.'s No. 5 Rodessa O. & Land Co., 289 ft. S, 140 ft. E, C Sec. 22-23-16.
Rigging up.

Ark.-La. Gas Co.'s No. 4 Rodessa Oil & Land Co., 590 ft. S, 588 ft. E, NW cor. NE Sec. 22-23-16.
Drlg. shale 4,345 ft.

Ark.-La. Gas Co.'s No. 3 Rodessa O. & Land Co., 1,945 ft. S, 719 ft. W, NE cor. Sec. 22-23-16.
Comp. flowing 92 bbls. per hour 6,000 ft.

Bartex Pipe Line Co.'s No. 1 Norton Est., 660 ft. N and W, SE cor. NE Sec. 13-23-15.
Rigging up.

Bartex Pipe Line Co.'s No. 1 Rodessa O. & Land Co., 660 ft. N and W, SE cor. NE SE Sec. 13-23-16.
Derrick.

Danciger & Hall's No. 1 Willis C Lot 5, Blk. 7, Sec. 23-23-16.
Derrick.

Eastern Texas Prod. Co.'s No. 1 Caddo School Board, CSL NE SW Sec. 23-23-16.
Comp. 20,000,000 ft. gas 6,032 ft.

Haynes Prod. Co.'s No. 3 Sexton, 285 ft. S and 236 ft. W NE cor. SW NE Sec. 14-23-16.
Drlg. 2,680 ft.

Haynes Prod. Co.'s No. 3 Lawton, 660 ft. N, 990 ft. E, SW cor. Sec. 14-23-16.
Drlg. 4,275 ft.

Haynes Prod. Co.'s No. 2 T. F. Sexton, 665 ft. N, 660 ft. E, C Sec. 14-23-16.
Drlg. 5,550 ft.

Haynes Prod. Co.'s No. 2 Otwell, 660 ft. N and 330 ft. E of SW cor. Sec. 14-23-16.
Set 7-in. 5,816 ft.; coring 6,000 ft.

W. M. Layton et al's No. 1 Tyson, 325 ft. N, 330 ft. W, C Sec. 22-23-16.
Drlg. 4,677 ft.

McAlester Fuel Co.'s No. 1 Tyson, 250 ft. N, 150 ft. W, C Sec. 22-23-16.
Drlg. 3,160 ft.

Geo. Mannahan's No. 1 T. M. Comegys, 330 ft. N and W, SE cor. NE SE Sec. 10-23-16.
Drlg. 5,345 ft.

R. W. Norton's No. 2-A Caddo Levee Board, 1,320 ft. S, 660 ft. E, C Sec. 21-23-16.
Drlg. 4,105 ft.

R. W. Norton's No. 1 Tyson heirs, 1,980 ft. E, 660 ft. S, NW cor. Sec. 13-23-16.
Drlg. 5,681 ft.

R. W. Norton's No. 1 Fosque, 1,980 ft. N, 660 ft. W, SE cor. Sec. 20-23-16.
Drlg. 5,715 ft.

Pelican Oil & Gasoline Co.'s No. 2 Sexton, 330 ft. N and E, SW cor. SE NE Sec. 14-23-16.
Drlg. 4,343 ft.

Pelican Oil & Gasoline Co.'s No. 3 Sexton, 330 ft. S and E, NW cor. SE NE Sec. 14-23-16.
Drlg. 2,625 ft.

United Gas Public Service Co.'s No. 1 Poole, 660 ft. S and W, NE cor. Sec. 21-23-16.
Drlg. 4,196 ft.

United Gas Public Service Co.'s No. 1 Ardie & Co., 660 ft. N, 1,980 ft. W, SE cor. Sec. 14-23-16.
Drlg. 4,150 ft.

United Gas Public Service Co.'s No. 2 Rodessa Oil & Land Co., 660 ft. S and W. NE cor. Sec. 22-23-16.
Comp. flowing 2,500 bbls. daily 6,003 ft.

United Gas Public Service Co.'s No. 1 Rodessa Oil & Land Co., 1,980 ft. N and 660 ft. W, SE cor. Sec. 15-23-15.
Testing 5,978 ft.; old T.D. 6,046 ft.

G. H. Vaughn Prod. Co.'s No. 1 Hunter-Derryberry, 990 ft. S, 1,804 ft. E, NW cor. Sec. 14-23-16.
Set 7-in. 5,900 ft.; T.D. 6,026 ft.

G. H. Vaughn Prod. Co.'s No. 1 T. M. Comegys, 330 ft. N and E, SW cor. SE SE Sec. 10-23-16.
Testing 5,996 ft.

Sabine Parish—Zwolle

Alexander & Crane's No. 1 Fogman, SE cor. N½ SW NE Sec. 18-7-11.
S.D. 2,655 ft.

Ivan A. Allen No. 1 Travis, 330 ft. S and W of NE cor. NE NW Sec. 13-7-11.
Drlg. 2,410 ft.

H. C. Mauiding's No. 1 Davis, 250 ft. N and W, SE cor. NE NE Sec. 2-7-11.
S.D. 400 ft.

A. H. Tarner's No. 1 Baker, 330 ft. S and E NW cor. NW NE Sec. 36-8-12.
Cleaning hole to deepen 4,127 ft.

EAST TEXAS
(Border Counties)

Cass County

American Liberty Oil Co.'s No. 1 J. B. Rodgers, 330 ft. N, 430 ft. W, SE cor. of 160-ac. tract in C. M. Robinson Sur.
Set 16-in. 200 ft.; drlg. 1,000 ft.

United Gas Public Service Co.'s No. 1 Thurman, 1,370 ft. S, 1,320 ft. W. NE cor. John Coleman Sur.
Drlg. 4,970 ft.

Harrison County

R. C. Payne et al's No. 1 Lowery, H. D. Spain Sur.
P.B. to 3,524 ft.

Marion County

Ed S. Holman's No. 1 Henderson, R. Bennington Sur.
P.B. to 2,443 ft.

Panola County

R. A. Graddy's No. 1 M. J. McCormick, J. McAdams Sur.
Drlg. 2,675 ft.

George Hudson et al's No. 1 J. F. Nail, C. McGeary Sur.
Set 8-in. 40 ft.; fishing for core bbl. at 2,345 ft.

Geo. Le Grand's No. 1 P. J. Wardleigh, A. Thompson Sur.
Set 10-in. 62 ft.

R. W. Price's No. 1 Crawford, J. A. Williams Sur.
Set 10-in. 64 ft.

Fred Stovall Drlg. Co.'s No. 1 H. D. Ivey, P. Martin H.R.S.
S.D. for csg. 1,980 ft.

Shelby County

Cliff Stoval's No. 1 Pickering Lbr. Co., C. H. Patterson Sur.
S.D.; rig repair, 1,485 ft.

GULF COAST WILDCATS

Week Ending November 9

Raccoon Bend—Austin County

Humble O. & R. Co.'s No. 16-X Woodley, 750 ft. NE of SW line, 850 ft. NW of SE line, 300 ft. SE of No. 15-X, Wm. Harvey Sur.
T.D. 3,458 ft.; top sand 3,400 ft.; 7-inch csg. at 3,397 ft.

Humble O. & R. Co.'s No. 8-X Hellmuth, 3,095 ft. from NW line, southeasterly along N line of S. Hellmuth tract, 464 ft. SW at right angles from NE line of lease, Wm. Harvey Sur.
T.D. 4,097 ft.; top sand 4,025 ft.; set 7-inch csg. at 4,017 ft.

Humble O. & R. Co.'s No. 15 Woodley, 1,150 ft. NW of SE line, 750 ft. NE of SW line, 607 ft. southerly from No. 14-X, William Harvey Sur.
T.D. 4,144 ft.; 7-in. csg. at 4,117 ft.; I.P. 116 bbls. per day; T.P. 60 lbs., C.P. 530 lbs.

Humble O. & R. Co.'s No. 8 Wilson, 150 ft. NE of SW line, 1,000 ft. SE No. 6-X, William Harvey Sur.
T.D. 4,174 ft.; shut down at 3,295 ft.

Humble O. & R. Co.'s No. 3 H. F. Granen, 682 ft. NE of No. 1, 150 ft. SE of NW¼ of 63.8-ac. tract, Smeathers Sur.
Location.

Humble O. & R. Co.'s No. 7-X McCasland, 190 ft. NW line, 168 ft. SE line of Smeathers & White Sur.
Location.

Damon Mound—Brazoria County

Intercoastal Oil Co.'s No. 14 Wisdom, 34 ft. NE of SW line, 43 ft. NW of SE line of Lot A, Blk. 51, A. Darst Sur.
Location.

Hastings—Brazoria County

Humble O. & R. Co.'s No. 1 G. W. Nelson, 330 ft. N and W of SE cor. of Lot 3, Sec. 26, approx. 660 ft. W of No. 2 Cannon, H.T.&B. Sur. No. 36.
Derrick.

Humble O. & R. Co.'s No. 2 Cannon, 330 ft. out of NE cor. of 60-ac. tract, H.T.&B. Sur. No. 36.
T.D. 5,929 ft.; 7-inch csg. at 5,697 ft.; flowing in burning pits, no gauge.

Humble O. & R. Co.'s No. 1 J. F. Bridges, center of N 10 acres of 20-ac. lease, A.C.H.&B. Sur. No. 2.
Location.

Humble O. & R. Co.'s No. 2 J. F. Bridges, center of S 10 acres of 20-ac. lease, A.C.H.&B. Sur. No. 2.
Location.

Stanolind O. & G. Co.'s No. 2 Shaw, 330 ft. W of most northerly NE cor. of 120-acre tract, H.T.&B. Sur. No. 36.
T.D. 112 ft.; 16-inch csg. at 106 ft.

Stanolind O. & G. Co.'s No 4 Drake, 330 ft. S, 330 ft. E of most westerly NW cor. of Drake 120-acre tract, H.T.&B. Sur. No. 36.
Location.

Stanolind O. & G. Co.'s No. 3 Pennock, 1,320 ft. S, 330 ft. E of NW cor. of 40-acre tract, H.T.&B. Sur. No. 36.
Derrick.

Stanolind O. & G. Co.'s No. 2 Hutchinson, 330 ft. E and 2,404 ft. N of SW cor. of 40-ac. tract, H.T.&B. Sur. No. 36.
T.D. 6,080 ft.; I.P. 166 bbls. in 9 hours, ¼-in. choke, C.P. 875 lbs., T.P. 825 lbs., completed, no gauge.

Stanolind O. & G. Co.'s No. 1 Whiton, 330 ft. S, 500 ft. W of the NE cor. of G. W. Whiton 10-ac. tract, A.C.H.&B. Survey No. 2.
Cemented 7-inch csg. at 6,080 ft.

Stanolind O. & G. Co.'s No. 2 Ford, 330 ft. N, 3,092 ft. W of SE cor. of 199.3-ac. tract, A.C.H.&B. Sur. No. 1.
T.D. 6,112 ft.; flowed 90 bbls. in 12 hrs., 10/64-inch choke; T.P. 925 lbs., C.P. 925 lbs.

Stanolind O. & G. Co.'s No. 2 Kidd, A.C. H.&B. Sur. No. 2, 330 ft. E of most easterly W line, 416 ft. S of N line of 58.4-ac. tract.
T.D. 6,115 ft.; 7-in. csg. at 6,083 ft.; perforated csg. from 5,975-77 ft., made little oil and gas, fishing for screen to core deeper.

Stanolind O. & G. Co.'s No. 3 Williams, A.C.H.&B. Sur. No. 1, 330 ft. W, 119.4 ft. S inside of NW cor. of 58.5-ac. tract.
Running tubing and screen at 6,106 ft.; 7-in. csg. at 6,093 ft.; completed, no gauge.

Stanolind O. & G. Co.'s No. 2 Drake, 330 ft. N, 1,650 ft. W from SE cor. of 120-ac. lease, H.T.&B. Sur. No. 36.
Derrick.

Stanolind O. & G. Co.'s No. 2 Pennock, 330 ft. N, 1,650 ft. W from SE cor. of 40-ac lease, H.T.&B. Sur. No. 36.
Drlg. shale 5,572 ft.

Stanolind O. & G. Co.'s No. 4 Sneed, 330 ft. S, 330 ft. W of NE cor. of Lot 12, D. M. Jay Subd., on Sneed 225-ac. tract, A.C. H.&B. Sur. No. 2.
T.D. 8,220 ft.; reaming hole to 7,812 ft.

Manvel—Brazoria County

Alpha Pet. Co.'s No. 1 Hart, 185 ft. NSL, 330 ft. EWL, Lot 9, H.T.&B. Sur.
Completed, no gauge.

Gulf Prod. Co.'s No. 5 Colby, 330 ft. from NW line of lease, 660 ft. SW of No. 3, T. Spraggins Sur.
Drlg. shale 4,510 ft.

Jay Simmons' No. 1 Wilson, center of Lot 25, H.T.&B. Sur. No. 23.
Location.

Sinclair Prairie Oil Co.'s No. 1 Michaelson, 330 ft. E of W line and midway of N and S lines, Lot 19, H.T.&B. Sur. No. 24.
Location.

J. W. Sorrells' No. 1 Swift, Blk. 21, Abst. 318, H.N. Little Sur.
Derrick.

Texas Co's No. 19 Houston Oil Field Assn., 330 ft. N, 76 ft. from SW cor. of Lot No. 31, A.C.H.&B. Sur. No. 91.
T.D. 1,178 ft.; 10-in. csg. at 1,173 ft.

Texas Co.'s No 17-B Belcher, N 48 deg., W 2,200 ft., N 42 deg., 955 ft. from S cor. of lease and survey, H. N. Little Sur.
16-in. csg. at 48 ft.

Texas Co.'s No. 2 John Groce, 857 ft. S, 200 ft. E of NW cor. of Chas. O'Donnell Sur.
Drlg. sand and shale 2,974 ft.

Texas Co.'s No. 1 Doonan, 990 ft. N, 42 deg. E and 330 ft. S, 48 deg. E from W cor. of Lot 17, T. Spraggins Sur.
Drlg. shale 3,438 ft.

Texas Co.'s No. 4 Rash, 48 deg. E, 1,650 ft. S and 42 deg. W, 330 ft. N of NE cor. of lease, T. Spraggins Sur.
Plugged back to 4,198 ft. from 4,300 ft.; 7-in. csg. at 4,198 ft., tested salt water, 4,188-4,150 ft.

Texas Co.'s No. 1 Richard, 2,475 ft. N, 330 ft. W of SE cor. of Lot 15, H.&T.B. Sur., Sec. 23.
T.D. 4,047 ft.; I.P. 166 bbls. per day, ⅝-in. choke, T.P. 160 lbs.

Texas Co.'s No. 2 Dawson, 247 ft. S, 241 ft. W of NE cor. of Lot 58, H.T.&B. Sur. No. 23.
Location.

Old Ocean—Brazoria County

Harrison & Abercrombie's No. 2 Bernard River, 1,000 ft. N, 54 deg. W, 400 ft. S. 36 deg. W of No. 1. Charles Brown Sur.
Cementing 7-in. csg. at 8,580 ft.; T.D. 8,657 ft.; I.P. 31 bbls. per hour, ¼-in. choke.

Pledger—Brazoria County

Humble O. & R. Co.'s No. 3 Smith, 5,187 ft. NE of most southerly SW line, 2,103 ft. NW of SE line, D. McNeel Sur.
T.D. 6,750 ft.; top sand 6,642 ft.; 7-in. csg. 6,568 ft.; W.O.C.

West Columbia—Brazoria County

Varner Oil Co.'s No. 1 Hogg, 800 ft. from most easterly W line and 3,600 ft. from N line of 400-ac. tract, M. Varner Sur.
Spudded and S.D.

Port Lavaca—Calhoun County

Crown Central Oil Co.'s No. 1 Wilson, 600 ft. NW line, in center of tract, A. Esparza Sur.
T.D. 6,315 ft.; plugged back 3,959 ft.; Making D.S.T. at 5,252 ft.

Halliburton Oil Co.'s No. 4 Burton, M. Sanches Sur.
T.D. 6,264 ft.; 7-in. csg. at 6,224 ft.; swabbing.

Anahuac—Chambers County

Domistic Exploration Co.'s No. 1 Marshall, 466 ft. out of NE cor. of A. W. Marshall 54.6 acre tract, H.&T.C. Sur., Sec. 55.
Rig up.

Gulf Prod. Co.'s No. 1 Knowles, 2,154 ft. SN line, 467 ft. EW line, Sec. 46, H.&T.C. Sur.
Drlg. shale 8,619 ft.

Humble O. & R. Co.'s No. 10 Middleton, 466 ft. from N and E lines of A. Milton Sur. No. 58.
Location.

Humble O. & R. Co.'s No. 6 Broussard, 3,058.4 ft. from W line, 466 ft. from N line, H.&T.C., Sec. 63.
Location.

Humble O. & R. Co.'s No. 7 Clark, 1,205.5 ft. from N line, 466 ft. from W line, H.&T.C., Sec. 57.
Location.

Humble O. & R. Co.'s No. 1 Zappe, 466 ft. from S and E lines, H.&T.C., Sec. 51.
Location.

Humble O. & R. Co.'s No. 2-B Broussard, 369 ft. E of No. 1-B, 466 ft. S of N line, Sec. 59, H.&T.C. Sur.
Drlg. sand and bldrs. 2,100 ft.; 10¾-in. csg. at 1,542 ft.

Humble O. & R. Co.'s No. 3-B Broussard, 869 ft. E from No. 2-B, 466 ft. S of N line, Sec. 59, H.&T.C. Sur.
Location.

Humble O. & R. Co.'s No. 9 Middleton, 873 ft. S of No. 5, 466 ft. W of E line, Sec. 58, H.&T.C. Sur.
T.D. 1,539 ft.; 10¾-in. csg. at 1,517 ft.; W.O.C.

Humble O. & R. Co.'s No. 3 White, 933 ft. W from No. 2, 466 ft. N of S line of lease, James McGahee Sur.
T.D. 7,077 ft.; top sand 6,993 ft.; 7-in. csg. at 7,039 ft.; W.O.C.

Humble O. & R. Co.'s No. 1 Broussard, 466 ft. S of N line, 466 ft. E of W line of Sec. 59, H.&T.C. Sur.
T.D. 7,082 ft., top sand 6,902 ft.; 7-in. csg. at 7,020 ft.; I.P. 26.7 bbls. per hour, ¼-in. choke, T.P. 1,750 lbs., C.P. 2,100 lbs.

Humble O. & R. Co.'s No. 6 Clark, 1,339 ft. N of S line, 466 ft. E of W line of Sec. 57, H.&T.C. Sur.
Location.

Humble O. & R. Co.'s No. 7 Middleton 466 ft. E of W line and N of S line of 100-ac. tract in NE cor. of Sec. 56, H.&T.C. Sur.
Drlg. shale 6,161 ft.

Humble O. & R. Co.'s No. 8 Middleton, 2,212 ft. E of W line, 466 ft. N of S line of Sec. 58, H.&T.C. Sur.
Drlg. shale 4,375 ft., 10¾-in. csg. at 1,461 ft.

Humble O. & R. Co.'s No. 2 Broussard 2,332 ft. E of W line, 2,332 ft. N of S line of Sec. 63, H.&T.C. Sur.
Location

Sun Oil Co.'s No. 4 White, 933 ft. W of No. 3., 516 ft. S of N line of lease, J. McGahey Sur.
Moving in.

Sun Oil Co.'s No. 3 White, 507 ft. S of N line, 1,933 ft. W of No. 2 James McGahey Sur.
T.D. 7,084 ft.; 7-in. csg. at 7,040 ft.; I.P. 28 bbls. per hour, ¼-in. choke, T.P. 1,000 lbs.; C.P. 1,100 lbs.

Johnson & Anderson's No. 1 J. T. White, 466 ft. from S and E lines of N 400 acres of James McGahey Sur.
Drlg. sand and shale 4,604 ft.

Barbers Hill—Chambers County

Sun Oil Co.'s No. 1 Higgins, (W.O.) sidetracking at 2,392 ft.

Sun Oil Co.'s No. 15 Wilburn (W.O.)
Sidetracking at 4,302 ft.

Sun Oil Co.'s No. 18 Wilburn, 80 ft. N. 75 ft. E of SW cor. of tract, Wm. Hodges Sur.
Drlg. gumbo 920 ft.

Stanolind Oil & Gas Co.'s No. 11-B Wilburn, 50 ft. E of W line, 50 ft. S of N line of tract, Wm. Hodge Sur.
Bldg. derrick.

Stanolind O. & G. Co.'s No. 29 Chambers, 224 ft. E of No. 21 W. Bloodgood Sur.
Derrick.

Stanolind O. & G. Co.'s No. 31 Chambers, 20 ft. S, 50 ft. W of NW cor. of Sur. A lease.
Drlg. salt 3,397 ft.

Big Creek—Fort Bend

Gulf Prod. Co.'s No. 66 Davis, 2,760 ft. NE along SE line of lease from W corner of Texas Co.'s 300-ac. lease, 1,285 ft. NW at R/A, M. Young Sur.
Rig up.

Gulf Prod. Co.'s No. 65 Davis, 2,260 ft. NE along SE line of Davis 2,228-ac. tract or NW cor. Texas Co.'s 300-ac. tract and 1,775 ft. NW at R&A. 500 ft. SE of No. 64 M. Young Sur.
W.O.C. 3,893 ft.; 7-in. csg. at 3,775 ft.; I.P. 68 bbls. in 9 hrs. thru ½-in. choke.

Blue Ridge—Fort Bend County

San Jacinto Oil Co.'s No. 8 Blakely, 260 ft. due E of No. 5, 325 ft. W from center of road, Lot 8, Blk. E, E. Drew Sur.
Moving in.

Trans State Oil Co.'s No. 1-B Blakely, 100 ft. E of W line, 175 ft. N of S line Lot 6, Blk. G, E. Drew Sur.
Drlg. shale 3,110 ft.; no report.

Boling—Fort Bend County

Texas Co.'s No. 14-A Taylor, 409 ft. NW of No. 13-A, 200 ft. NE of No. 9-A, S. F. Austin League.
Drlg. sand, shale and lime 3,240 ft.

Orchard—Fort Bend County

Gulf Prod. Co.'s No. 2-A Moore, Burnap Sur.
Bldg. derrick.

Gulf Prod. Co.'s No. 1-A J. M. Moore, 1,430 ft. W, 110 ft. N of SE cor. of sur. Durman Imigration A-177.
Abandoned 1,128 ft.

Gulf Prod. Co.'s No. 44 Moore, 500 ft. NW of No. 42, Leo Burknapp Sur.
Shale 3,551 ft.

Gulf Prod. Co.'s No. 43 Moore, 350 ft. E along S line of SW cor. of E.M.&G. Co. Sur. and 740 ft. N at R/A to said line of lease, 350 ft. E of No. 3 Moore.
Shale and lime 7,282 ft.

Thompson—Fort Bend County

Gulf Prod. Co.'s No. 14-A Gubbles, 970 ft. S of N line, 1,345 ft. W of E line, 128-ac. tract, Blk. 6, Tract No. 3, S. Kennedy Survey.
Derrick.

Gulf Prod. Co.—Humble Oil & Ref. Co.'s No. 26-A Booth, 921 ft. W of No. 23, 884 ft. N of S line of lease, S. Kennedy Sur.
T.D. 5,010 ft.; I.P. 62 bbls. per hour, 640 lbs. T.P.

High Island—Galveston County

Stanolind O. & G. Co.'s No. 1-C Marrs-McLean, 450 ft. S of N line of Lot 5, M. Dunman Sur.
Drlg. sand and bldrs. at 1,147 ft.

Stanolind O. & G. Co.'s No. 1-B Smith Royalty Acct., 200 ft. EW line, 1,660 ft. NS line, Susan Hope Sur. No. 3.
Drlg. shale 2,432 ft.

Stanolind O. & G. Co.'s No. 50 Cade, 850 ft. WE line, 950 ft. NS line of 460-ac. tract, N. Fitzsimmons Sur.
Rig up.

Stanolind O. & G. Co.'s No. 51 Cade, 690 ft. SN line, 620 ft. WE line of 460-ac. tract, Fitzsimmons Sur.
Rig up.

Stanolind O. & G. Co.'s No. 49 Cade, 372 ft. from NW line, 150 ft. from NE line of N. Fitzsimmons Sur.
Drlg. oil sand 5,704 ft.

Stanolind O. & G. Co.'s No. 4-A Taylor, 62.5 ft. from W line of 15.7-ac. tract, 120 ft. N of No. 1-A M. Dunman Sur.
T.D. 4,812 ft; P.B. and sidetracked at 4,285 ft.; I.P. 338 bbls. per day, ¼-in. choke, T.P. 350 lbs.

Stanolind O. & G. Co.'s No. 48 Cade, 900 ft. SE and 150 ft. NE of SW corner Block 4 Fitzsimmons Survey.
T.D. 5,896 ft.; cemented back to 5,075 ft., drlg. out cement to 5,700 ft.

Dickinson—Galveston County

Coast Pet. Co.'s No. 2 Maco Stewart, 660 ft. due W of No. 1, 330 ft. NS line of lease, W. K. Wilson Sur.
Drlg. shale 7,230 ft.

Humble O. & R. Co.'s No. 3-B Stewart, 3,954 ft. S along E line from NE cor. and 577.2 ft. W at right angles, J. Sellers Sur.
Drlg. shale and bldrs. at 4,560 ft.

Humble Oil & Ref. Co.'s No. 2 Townes, 933 ft. E of No. 1, 1,133 ft. W of E line, 3,604 ft. N along E line of SE cor. of B.B.B.&C. Sur.
T.D. 8,065 ft., cored sand and shale showing oil 8,004-54 ft.; 7-in. csg. at 8,030 ft.; I.P. 18 bbls. per hour, ¼-in. choke, T.P. 1,900 lbs., C.P. 2,500 lbs.

Humble O. & R. Co.'s No. 1-B Bayou Dev. Co., 500 ft. S of lake in NW cor. of lease, 600 ft. E of W line, John Sellers Sur.
Coring sandy shale 8,673 ft.; oil odor from 8,641-71 ft.

Humble O. & R. Co.'s No. 1 San Leon Farm, 1,300 ft. N of N bank of Dickinson Bayou, 100 ft. E of EL of J. S. Jones Sur. in 300-ac. tract, A. Edwards Sur.
Drlg. sand and shale 5,849 ft.

Humble Oil & Refg. Co.'s No. 6-A Maco Stewart, 6,087 ft. S of NE corner, 1,390 ft. W of E line and 1,390 ft. E of W line and 466 ft. N of S line of Stewart T.D. 8,637 ft.; top sand 8,621 ft., reaming.

Humble O. & R. Co.'s No. 5-A Stewart, 466 ft. W of E line of Stewart "A" Lease, 5,560 ft. due S of No. 2-A Stewart, John Sellers Sur.
Rig.

Humble O. & R. Co.'s No. 1 E. E. Anderson, 375 ft. N of S line, and midway between E and W lines of Lot No. 4, John Sellers Sur.
T.D. 9,127 ft.; perforated csg. 9,098-9,107 ft. with 10 holes, D.S.T. from 9,088-9,107 ft., tested dry, perforated 9,095-9,104 ft. with 18 holes, tested 11 min., rec. 15 ft. of mud, perforated 9,089-93 ft. with 10 holes, D.S.T. from 8,879-9,107 ft., showed 1,300 lbs. pressure, 28 min.

Pure Oil Co.'s No. 2 J. W. Shelor, 779 ft. N. 182 ft. W of N. I. Shelar, B.B.B. &C. Sur.
T.D. 8,481 ft.; P.B. 4,815-4,650 ft.; sidetracking 8,000 ft.

Stanolind O. & G. Co.'s No. 3 State, 633 ft. SE of No. 1, 218 ft. N of S bank of Dickinson Bayou Sur., Tract No. 3.
Sidetracked at 7,347 ft. and cemented off fish, topped plug at 7,015 ft.; W.O.C.

Stanolind O. & G. Co.'s No. 2 State, 1,369 ft. E of No. 1 State.
Drlg. shale 7,984 ft.

Turman Oil Co.'s No. 2 Plaza, 321 ft. W of E line, 730 ft. S of N line, 945 ft. E of No. 1, J. S. Sherman Sur.
Location.

Arriola—Hardin County

Houston Oil Co.'s No. 6-X fee, 2,620 ft. from E line, 400 ft. SW of No. 5, E. Arriola Sur.
(O.W.D.D.); T.D. 3,402 ft.; set screen and swabbing.

Republic Oil C.'s No. 10 fee (old well)
T.D. 4,212 ft.; pumping 75 bbls. fluid per day, 50 per cent salt water.

Batson—Hardin County

D. & L. Prod. Co.'s No. 1 Hooks, 100 ft. S of N line, 300 ft. E of W line 26.75-ac. tract, W. Donoho Sur
Drlg. sandy shale 6,008 ft.

John Deering et al's No. 1 J. W. Whitley, 160 ft. SN line, 240 ft. EW line of 130-ac. tract, W. Donoho Sur
S.D. 780 ft., rigging up heavier rig.

Shell Pet. Corp.'s No. 2 Jackson, 190 ft. W El., 395 ft. N of SL of lease, W. Donoho Sur.
Location.

Texas Co.'s No. 1 Christian, 100 ft. from W line, 350 ft. from N line of 26.45-ac. tract, W. Donoho Sur.
T.D. 4,980 ft.; I.P. 487 bbls. per day, ¼-in. choke, T.P. 550 lbs., C.P. 750 lbs.

Saratoga—Hardin County

Hines' No. 2 Caswell, 8,600 ft. N of S line, 1,376 ft. E of W line of B.B.B.&C.R.R. Co. Sur. No. 72.
S.D. 3,695 ft.

Rio Bravo Oil Co.'s No. C-142, 480 ft. E of W line of 100-acre tract, J. F. Cotton Sur.
Completed, no gauge.

Pierce Junction—Harris County

J. S. Abercrombie et al's No. 7 John Ritter, 535 ft. E of W line, 156 ft. N. 17 deg. 42 ft. W at right angles, James Hamilton Sur.
Drlg. rock at 1,800 ft.

Gulf Prod. Co.'s No. 11 H. C. Cain, 390 ft. from W line, thence 439 ft. at R/A to N line of 139-ac. tract, Jas. Hamilton Sur. No 98
T.D. 6,202 ft.; oil sand, swabbing.

Navarro Oil Co.'s No. 3-B Cain, Jas. Hamilton Sur
T.D. 7,078 ft.; shale; heaved to 7,018 ft.; P.B. to 6,130 ft.; sidetracked and drilled at 5,554 ft.; twisted off D.S.; fishing.

Rio Bravo Oil Co.'s No. 1-A Settegast fee, on line between B.B.&C. and Joseph Kopman Sur., 350 ft. due W of SE cor. of Settegast 68.25-ac. tract on survey and property line.
Coring oil sand 4,205 ft.

Rio Bravo Oil Co.'s No. 3 Rio Bravo, G.H.&S.A.R.R., 1,400 ft. EW line of survey, 10 ft. SN line at right angles, J. Hamilton Sur.
T.D. 3,480 ft., oil sand, top sand 3,445 ft. 7-in. csg. 3,445 ft.; testing.

Humble—Harris County

Texas Co.'s No. 38 Koehler, 1,750 ft. N, 500 ft. E of SW cor. of the tract, J. B. Stevenson Sur.
T.D. 4,799 ft.; P.B. to 3,275 ft., 7-in. csg. at 3,164 ft.

Mykawa—Harris County

Danciger O. & R. Co.'s No. 4 Minnetex, 300 ft. WE line, 250 ft. SN line of Lot 192, Wm. Lovett Sur.
Drlg. below 4,800 ft., no report.

West Prod. Co.'s No. 5 Irwin, 795 ft. SN line, 806 ft. WE line of lease, W. B. Walker Sur.
Drlg. shale and lime 2,070 ft.

West Prod. Co.'s No. 2 Lobit, 403 ft. EW line, 200 ft. SN line, Lot 17, F. J. Rothas Sur.
T.D. 4,938 ft.; P.B. to 3,600 ft.; drlg. shale 3,820 ft.

South Houston—Harris County

Diadem Oil Co.'s No. 1 Mrs. Alice Dean, center of Lot 152, H.T.&B. Sur. No. 6, 141 ft. EW line, 100 ft. SN line of lot.
Cored shaley sand 4,726-31 ft. with oil show.

Stanolind O. & G. Co.'s District 19, No. 1, center of Lot 8, Blk. 77.
T.D. 4,118 ft.; 7⅝-in. csg. at 4,096 ft.; W.O.C.

Stanolind O. & G. Co.'s District 21, center Lot 1, Blk. 62.
T.D. 1,895 ft.; running 13⅜-in. csg.

Stanolind O. & G. Co.'s District 22, No. 1, center of Lot 8, Blk. 71.
Reaming oil sand 3,958 ft.

Stanolind O. & G. Co.'s District 27, No. 1, center Lot 1, Blk. 102.
Drlg. sandy lime 1,372 ft.

Stanolind O. & G. Co.'s No. 1 Meadowbrook, 417 ft. at right angles from NE line, 417 ft. from center line of Berry Gully, 414 ft. NW along NE line and 417 ft. southwesterly at right angles.
Drlg. salt water sand 5,828 ft.

Stanolind O. & G. Co.'s Drlg. District 5, No. 1, center of Lot No. 2, Blk. 7.
T.D. 3,862 ft.; 7⅝-in. csg. 3,846 ft.

Stanolind O. & G. Co.'s Drlg. District 8, No. 1, center Lot 16, Blk. 32.
Drlg. shale at 3,860 ft.

Stanolind O. & G. Co.'s Drlg. District 10, center Lot 16, Blk. 28.
Drlg. shale 4,540 ft.

Stanolind O. & G. Co.'s No. 1 fee, 330 ft. S, 300 ft. E of NW cor. of 20-ac. tract, H.T.&B. Sur. No. 5.
Drlg. lime 5,800 ft.

Stanolind O. & G. Co.'s No. 1 Ed Wells, C Lot 3, Blk. 146, 1,240 ft. E, 2,270 ft. N of No. 1, H.T.&B. Sur. No. 5.
Temp. abd. 5,600 ft.

Tomball—Harris County

Humble O. & R. Refg. Co.'s No. 1 Dooley, 280 ft. N of S line, 388.7 ft. W of E line of lease, J. Pruitt Sur., 10¾-in. csg. at 960 ft.
W.O.C.

Humble O. & R. Co.'s No. 2 Holderreith, 500 ft. E of W line, 466 ft. N of S line, C. N. Pillot Sur.
10¾-in. csg. at 960 ft.

Humble O. & R. Co.'s No. 8-B Quilter, 600 ft. N of S line, 1,267 ft. W of E line of tract, A. Senchal Sur.
Drlg. shale 3,998 ft., 10¾-in. csg. at 932 ft.

Humble O. & R. Co.'s No. 1 Wilke, 466 ft. SN line, Lot 175, 311.5 ft. EW line, 466 ft. WE line, J. Pruitt Sur.
T.D. 5,570 ft., 7-in. csg. 5,565 ft.; I.P. 22 bbls. per hour, ¼-in. choke, T.P. 750 lbs., C.P. 675 lbs.

Humble O. & R. Co.'s No. 2-A Holderreith, 821 ft. southward at right angles to N line, 596 ft. NE of SW line, C. N Pillot Sur.
T.D. 5,545 ft., 7-in. csg. at 5,539 ft.; I.P. 23 bbls. per hour, ¼-in. choke, T.P. 800 lbs., C.P. 475 lbs.

Humble O. & R. Co.'s No. 1 Mrs. Jessie Mahaffey, 550 ft. E of W line, 432 ft. N of S line of 132-ac. tract, Jesse Pruitt Sur.
T.D. 5,571 ft.; 7-in. csg. at 5,566 ft.; preparing to perforate csg.

Humble O. & R. Co.'s No. 1 Michel, 491 ft. E of W line of Sur. and on line between lots 178 and 182 Tomball Townsite, J. Pruitt Sur.
Location

Sun Oil Co.'s No. 1 Metzler, 600 ft. N of S line, 466 ft. E of W line of middle SW cor. of 117.5-ac. lease, C. N. Pillot Sur.
Rig up.

Texas Co.'s No. 2 E. Hillegigeist, 1,829 ft. N, 430 ft. W from SW cor. of 100-acre lease and on a 199.8-ac. lease, J. House Sur.
Drlg. shale and lime 4,295 ft.

Mauritz-Jackson County

Shell Pet. Corp.'s No. 1-A T. N. Mauritz, 682 ft. S, 466 ft. W of NE cor. of 160-ac. lease, A. Kounts Sur.
Coring shale 5,901 ft.

Smith and McDannald's No. 1 Mauritz, 467 ft. WE line, 394 ft. NS line of survey, J. Cummings Sur. Abst. 236.
Abandoned, 6,714 ft.

Texas Pacific Coal & Oil Co. and Venza Oil Co.'s No. 1 J. M. Rosborough, 330 ft. each way out of NW cor. of 416-ac. lease of M.C. Sur. No. 37.
Coring shale 5,224 ft.

Big Hill—Jefferson County

Stanolind O. & G. Co.'s No. 2-A Pipkin & Davis, 1,430 ft. SW of NE cor. of Pipkin & Davis lease along SE line of same and 50 ft. SE at right angles, William McFaddin Sur.
Drlg. oil sand 6,609 ft., 7-in. csg. at 6,590 ft.

Stanolind O. & G. Co.'s No. 1-B Pipkin & Davis, 2,225 ft. from E line and 2,385 ft. from N line of survey, Wm. McFadden Sur.
T.D. 8,500 ft.; heaving shale at 6,678 ft.

Fannett—Jefferson County

Blue Eagle Oil Co.'s No. 1 Junker, 50 ft. each way out of NW cor. of lease, W. H. Smith Sur.
T.D. 4,116 ft.; 7-in. csg. at 4,076 ft., pulled derrick in, tested salt water and little oil.

Gulf Prod. Co.'s No. 9 Burrell, 2,010 ft. N along W line of 232-ac. tract from SE cor. of Thomas 446-ac. tract, thence 350 ft. E at right angles, W. H. Smith Sur.
Drlg. oil sand 4,412 ft.

Cleveland—Liberty County

Gulf Prod. Co.'s No. 12-C Kirby, 1,234 ft. N, 2,333 ft. E from NE cor. of J. Eldridge Sur.
Rig up.

Esperson—Liberty County

General Crude Oil Co.'s No. 20 Esperson (workover).
T.D. 3,613 ft., reaming.

General Crude Oil Co.'s No. 3 Davis (O. W.D.D.)
T.D. 4,132 ft.; reset screen at 4,119 ft.; I.P. 19 bbls. oil and 18 bbls. salt water.

General Crude's No. 1 Hiavaty, 467 ft. out of SE cor. of F. M. Gardner Sur.
Drlg. shale and sand 8,321 ft.

Hankamer—Liberty County

Eastman-Ward's No. 1 R. E. Lee, 115 ft. from N line of lease and 76 ft. W of west bank of White Bayou, Geo. Stengler Sur.
S.D. 2,707 ft.; drlg. water well.

Eljean Oil Co.'s No. 2 Exxell, 600 ft. due W of No. 1, 130 ft. from N and S lines of Levi-Barrow Sur.
S.D. 4,346 ft.

Gulf Prod. Co.'s No. 5 Crow & Jacobs, 2,900 ft. N. 2,140 ft. E of SW cor. of 300-ac. lease, H.&T.C. Sur.
T.D. 5,733 ft.; P.B. to 5,730 ft.; W.O.C.

Hull—Liberty County

Gulf Prod. Co.'s No. 111 Phoenix, 1,893 ft. S along W line from NW cor., 1,625 ft. E at R/A, J. Devore League.
Bldg. derrick.

W. B. Flynn's No. 8-B Able, 50 ft. S, 300 ft. W of NE cor. of old Humble 10-ac. tract.
S.D. 790 ft.

Republic Prod. Co.—Houston Oil Co.'s No. 158 Dolbear, 170 ft. NW of No. 99 and 250 ft. SW of No. 156, J. Devore League.
Drlg. rock 1,829 ft.

South Liberty—Liberty County

Sun Oil Co.'s No. 58 Mitchell, 50 ft. E of W line, 385 ft. N of S line of M. G. White League.
Preparing to set csg. at 808 ft.

R. R. Lawrence's No. 1 Vandeventer.
Drlg. shale and lime 2,159 ft.

W. S. Christian's No. 1 Chambers.
T.D. 675 ft., preparing to set 7-in. csg.

Markham—Matagorda County

Hamill & Hamill's No. 3 Kountze, 150 ft. due E of No. 2, Parker Sur.
Location.

Van Vleck—Matagorda County

Skelly Oil Co.'s No. 3 Cobb "B," 2,750 ft. from NW line, 2,900 ft. from SW line of M. Cummings Sur.
T.D. 8,708 ft.; drilled plugs to 8,228 ft.; perforated csg. from 8,228-35 ft., flowed 48 bbls. first 8 hrs. on ⅛-in. choke; T.P. 975 lbs., C.P. 1,000 lbs.

Skelly Oil Co.'s No. 1 Sally Johnson, 487 ft. W of E line, 395 ft. SN line of 27-ac. tract, M. Cummings Sur.
Drlg. shale 5,010 ft.

Skelly Oil Co.'s No. 1 Cobb, (work over)
T.D. 7,488 ft., 7-inch csg. 7,487 ft., flowed 199 bbls. 24 hrs. thru 3/16-in. choke.

Conroe—Montgomery County

Humble O. & R. Co.'s No. 77-A South Texas Dev. Co., 933 ft. N of No. 76-A, 1,603 ft. NE of SW line Theodore Slade Sur.
T.D. 5,089 ft.; pumping 35 bbls. per day.

Malta Oil Co.'s No. 10 Falvey, (work over)
Pulling screen to work over.

Sun Oil Co.'s No. 28 Foster.
Bldg. derrick.

Sun Oil Co.'s No. 22 Keystone Mills.
Drlg. shale and lime 2,661 ft.

Sun Oil Co.'s No. 10 Keystone Mills.
Derrick.

Splendora—Montgomery County

Bryce McCandless et al's No. 1 Texas Long Leaf Lbr. Co., 330 ft. from N and E lines of the W¼ of Blk. No. 8, Walker County School Land Sur.
Derrick.

Port Neches—Orange County

Texas Co.'s No. 11 Kuhn, 620 ft. N, 330 ft. E of SW cor. of 257.74-ac. tract, Mary E. Hall Sur.
Bldg. derrick.

Texas Co.'s No. 4-A Polk, 400 ft. N, 125 ft. E from SE cor. of Mary Hall Sur. No. 1, being in the T. J. Notgrass Sur.
T.D. 4,792 ft.; 9⅝-in. csg. at 4,769 ft.; preparing to cut screen.

Livingston—Polk County

Hawkeye Pet. Co.'s No. 1 Nelson, 330 ft. N of S line, 460 ft. E of W line of 300-ac. tract, A. Viesca Sur.
T.D. 4,243 ft., 7-in. csg. 4,217 ft.

Humble O. & R. Co.'s No. 18 Granbury, 5,239 ft. SE of NW line, Sec. 10, 1,194 ft. SW of NE line, Sec. 10, A. Viesca Sur.
Drlg. shale and lime 3,918 ft., 10¾-in. csg. at 551 ft.

Humble O. & R. Co.'s No. 16 Granbury, 1,399 ft. from NW and 466 ft. from NE lines of Block No. 11, A. Viesca Sur.
Location.

Ownby-Shell Pet. Corp.'s No. 4 Pratt, 466 ft. out of NW cor. of 197-ac. lease, A. Viesca Sur.
Drlg. shale 1,610 ft.

Sun Oil Co.'s No. 10 Pratt, 933 ft. W of No. 9, 466 ft. NSL of lease, A Viesca Sur.
Location.

Sun Oil Co.'s No. 9 Pratt, 660 ft. W of No. 6, 330 ft. S line of lease, A. Viesca Sur.
T.D. 4,250 ft., 7-in. csg. 4,222 ft.

Colotto Creek—Victoria County

Camp's No. 1 Kastner, 330 ft. from NE and SE lines of 52-ac. tract, Manchola Sur.
T.D. 2,842 ft., oil sand, 7-in. csg. at 2,836 ft., W.O.C.

Costa Oil Co.'s No. 1 Terrell, 990 ft. SWL, 330 ft. SEL of NE 125-acre tract, R. Manchola Sur.
Location.

Placedo—Victoria County

American Liberty's No. 1 Gray, 3,960 ft. SWL, 500 ft. SEL of S.A.&M.G. Sur.
Location.

Barnsdall Oil Co.'s No. 2 Gray, 4,760 ft. SWL, 500 ft. SEL of S.A.&M.G. Sur. No. 8.
Location.

Barnsdall-Felmont Oil Co.'s No. 2 Pickering, 320 ft. NE of NE line of G.H.&S.A. R.R. Sur., Lot 1, Lander, Pickering and Traylor Subd. of the Mitchell Pastures, Black and Sanderson Sur.
T.D. 4,780 ft., 7-in. csg. at 4,743 ft., flowing into pits, showing oil and gas.

Eastern Texas Pet. Co.'s No. 1-A Schovajsa, 50 ft. NW of Costa's No. 1 Schovajsa, W. Ripley Sur.
Drlg. shale 4,720 ft.

J. McDowell's No. 1 Kirasek, center Blk. 45, Placedo Townsite.
T.D. 4,771 ft., 7-in. csg. at 4,758 ft.; set screen, failed to flow, will use air lift.

C. F. McGrew's No. 1 Hadley, center of 20-ac. lot, S.A.&M.G. Sur., Sec. 9, Blk. 49, Lots 1 and 2.
Location.

Smith & Gulf's No. 2 Wright, 330 ft. each way out of W cor. of lease, S.A.&M.G. Sur. No. 5.
Location.

Sun Oil Co.'s No. 1 Schneider, 330 ft. from R.R., 330 ft. from SE line of Lot 132, NE offset to Sun's No. 2 Marek, S.A.& M.G. Sur.
Drlg. shale 2,000 ft.

Westgate Oil Co.'s No. 1 Henderson and Pickering, 330 ft. each way out of SW cor. of Lot 76, S.A.&M.G. Sur.
T.D. 4,778 ft.; 7-in. csg. at 4,754 ft., killed well, shut in.

Clay Creek—Washington County

Joe Pamykol's No. 2 Clapp, 300 ft. NE of No. 1, 450 ft. SW line, 150 ft. NW line of lease, N. Clay Sur.
Skidding derrick to location.

Sun Oil Co.'s No. 11 Clay, 750 ft. NW line, 150 ft. SW line, 218-ac. tract, J. F. Perry Sur.
Coring 895 ft.

Sun Oil Co.'s No. 3 Theo Qeube, 450 ft. from SE line and 150 ft. from NE line of 68.3-ac. tract, J. T. Perry Sur.
Abd. 1,600 ft.

Louise—Wharton County

Pure Oil Co.'s No. 1 H. F. Whiteside, 660 ft. NE and 330 ft. SE of W cor. of 80-ac. tract, M.&C. Sur., Sec. 19.
T.D. 5,160 ft., reaming to set csg.

Pure Oil Co.'s No. 1-B Garrett, 506.47 ft. NE, 429.5 ft. SE from W cor. of Sur No. 27, Morris & Cummings Sur.
T.D. 6,448 ft.; 7-in. csg. at 6,428 ft.; I.P. 329 bbls. per day.

Pickett Ridge—Wharton County

Texas Co.'s No. 4-A Pierce, 1,980 ft. S. 32 degrees E from Pierce No. 3-A H.& G.N. Sur., Sec. 38.
Drlg. shale 4,772 ft.

Texas Co.'s No. 5-A Pierce, 1,320 ft. N, 50 deg. E, 660 ft. S, 32 deg. E from No. 3-A, I.&G.N. Sur. No. 36.
Drlg. shale 1,736 ft.

SOUTH LOUISIANA FIELDS

Black Bayou—Cameron Parish

Shell Petroleum Co.'s No. 29 Watkins, 2,900 ft. E, 650 ft. S of NW cor. of Sec. 17-12s-12w.
Bldg. derrick.

Shell Pet Corp.'s No. 27 Watkins, 1,921 ft. S, 179 ft. E of NW cor. of Sec. 17-12s-12w.
T.D. 4,442 ft., oil sand; I.P. 728 bbls. per day through 18/64-inch choke; T.P. 615 lbs.; C.P. 475 lbs.

Shell Petroleum Co.'s No. 30 Watkins, 3,150 ft. W, 1,075 ft. S of NE cor. of Sec. 18-12s-17w.
Location.

Shell Pet. Corp.'s No. 28 Watkins, 1,929 ft. S, 925 ft. E of NW cor. of Sec. 17-12s-12w.
Sandy lime 2,876 ft.

Shell Pet. Corp.'s No. 26 Watkins, 3,380 ft. W, 100 ft. S of NE cor. of Sec. 18-12s-12w.
Location.

Shell Pet. Corp.'s No. 24 Watkins, 2,832 ft. W, 695 ft. S of NW cor. Sec. 18-12-12.
S.D. 4,538 ft.

Caillou Island—Terrebonne Parish

Texas Co.'s No. 24 Caillou Island, Sec. 17-23s-20e.
Drlg. sand 3,971 ft.

Texas Co.'s No. 1 State Terrebonne Bay, Sec. 19-23s-20e.
T.D. 6,017 ft.; P.B. to 5,016 ft. and stuck drill stem while reaming to 4,811 ft.; fishing.

Texas Co.'s No. 27 State, Sec. 17-23s-20e.
T.D. 5,674 ft.; abandoned in sidetracked hole at 2,482 ft.

Bosco—Acadia Parish

Superior Oil Prod. Co.'s No. 1 C. B. Hernandez, 2,791.6 ft. S, 330 ft. W of NE cor. of NW¼ Sec. 34-8s-3e (workover) old T.D. 8,659 ft., new T.D. 9,041 ft., prepare to test.

Superior Oil Co.'s No. 11 Larcade, 2,119 ft. E, 100 ft. S of NW cor. of Sur. 35.
Drlg. sandy shale 8,305 ft.

Tepetate—Acadia Parish

Continental Oil Co.'s No. 1 Kern, 1,610 ft. S, 660 ft. W of SE cor. of Sec. 29-7s-2w.
Derrick.

Continental Oil Co.'s No. 1 Macabee, 990 ft. N, and 660 ft. E of SW cor. of 160-ac. tract, Sec. 22-7s-2w.
Bldg. derrick.

Continental Oil Co.'s No. 1 Macantel, 990 ft. S, 660 ft. W of NE cor. of Sec. 29-7s-2w.
Derrick.

Continental Oil Co.'s No. 1 Henry Klumpp, 660 ft. W, 330 ft. S of NE cor. of Sec. 34, Twp. 7s-2w.
T.D. 9,000 ft.; P.B. and set 7-in. csg. at 8,442 ft.; P.B. to 8,335 ft.; I.P. 1,080 bbls. per day, ¼-in. choke; T.P. 600 lbs.; C.P. 900 lbs.

Continental Oil Co.'s No. 1 Homeseekers Dev. Co., 3,300 ft. W, 2,640 ft. N of SE cor. of Sec. 29-7s-2w.
T.D. 8,800 ft.; 7-in. csg. 8,617 ft.; plugging back from 8,518 to 8,305 ft.

Darrow—Ascension Parish

Humble O. & R. Co.'s No. 8 Gumble, 505 ft. SW of No. 6, 1,147 ft. SE of No. 2, Sec. 31-10s-2e.
Drlg. shale and lime 4,958 ft.

Humble O. & R. Co.'s No. 4 Gumble, 323 ft. at right angles to SW line of 121.9-ac. tract and 541 ft. SE from No. 2, Sec. 32-10s-2e.
Abandoned 6,645 ft.

Sorrento—Ascension Parish

Athens Oil Co.'s No. 3 United Land, 400 ft. W of No. 2, Sec. 15-10s-4e.
Location.

Cameron Meadows—Cameron Parish

Magnolia Pet. Co.'s No. 15 Cameron Meadows, 1,700 ft. W, 650 ft. S of NE cor. of NE¼ of Sec. 21-14s-13w.
Drlg. sand 3,363 ft.

Burton Sutton Oil Co.'s No. 9 School Land, 551 ft. N of S line, 293 ft. W of E line of Sec. 16-14s-13w.
W.O.C. 3,597 ft.

Burton Sutton Oil Co.'s No. 4 School Land, Sec. 16-14s-13w.
Derrick.

Choctaw Dome—Iberville Parish

Standard Oil Co.'s No. 6 Gay, 400 ft. N, 50 ft. W of No. 5, Sec. 52-9s-11e.
Location.

Zeni Oil Co.'s No. 1 Schwing, Sec. 19-17s-24e.
T.D. 6,162 ft.; P.B. to 1,500 ft.; preparing to sidetrack.

Dog Lake—Terrebonne Parish

Texas Co.'s No. 11 State, 1,100 ft. N, 2,476 ft. W of SE cor. of Sec. 21-21s-16e.
S.D. 2,014 ft.

Four Isle—Terrebonne Parish

Texas Co.'s No. 6 State, 1,925 ft. S, 2,100 ft. W of NE cor. of Sec. 23-21s-16.
Drlg. shale 6,511 ft.

Texas Co.'s No. 5 La. Land & Expl. Co., 2,177 ft. E, 1,385 ft. S of NW cor. Sec. 24-21s-16e.
Drlg. water sand 6,553 ft.

Texas Co.'s No. 5 State, 885 ft. S, 2,327 ft. E of NW cor. of Sec. 24-21s-16e.
Location.

Garden Island Bay—Plaquemines Parish

Texas Co.'s No. 17 State, 1,970 ft. N, 1,648 ft. E of SW cor. of Sec. 37-23s-23e.
Location.

Texas Co.'s No. 18 State, 1,268 ft. N, 2,318 ft. E of SW cor. of Sec. 37-23s-23e.
Location.

Texas Co.'s No. 13 State, 3,391 ft. S and 1,694 ft. W of NE cor. Sec. 107-23-32.
Rig up.

Gillis—Calcasieu Parish

Fohs Oil Co.'s No. 8 Castle, 275 ft. N and E of SW cor. NE¼ of SE¼ Sec. 14-9s-8w.
Drlg. shale 5,838 ft.

Fohs Oil Co.'s No. 7 Castle, 1,115 ft. S, 350 ft. E of NW cor. of NW cor. of NW¼ of SE¼ Sec. 14-9s-8w.
Cemented 7-in. csg. at 7,064 ft.; I.P. 540 bbls. per day, ¼-in. choke.

Union Sulphur's No. 5 Barbe, 1,160 ft. W, 589 ft. N of SE cor. of NE¼ Sec. 11-9s-8w.
Drlg. shale 3,865 ft.

Union Sulphur's No. 14 State, 1,462 ft. N, 69 ft. W of SE cor. NE¼ Sec. 11-9s-8w.
Location.

Union Sulphur's No. 4 Powell, 585 ft. S, 1,621 ft. E of NW cor. of Sec. 12-9s-8w.
Derrick.

Union Sulphur Co.'s No. 4 Barbe, 996 ft. N, 329 ft. W of SE cor. of NE¼ Sec. 11-9s-8w.
T.D. 6,776 ft.; P.B. to 6,664 ft.; I.P. 620 bbls. per day, ¼-in. choke.

Union Sulphur Co.'s No. 4 Reeves, 950 ft. W, 290 ft. S of NE cor. of SW¼, NW¼ Sec. 12-9s-8w.
Drlg. shale 6,712 ft.

Union Sulphur Co.'s No. 7 State, 1,316 ft. N, 199 ft. E of SW cor. Sec. 12-9s-8w.
Location.

Union Sulphur Co.'s No. 12 State, 2,310 ft. N, 1,350 ft. E of SW cor. of Sec. 12-9s-8w.
S.D. 7,100 ft.

Union Sulphur Co.'s No. 13 State, 1,464 ft. E, 2,038 ft. N of SW cor. of Sec. 12-9s-8w.
Location.

Gueydan—Vermillion Parish

Pure Oil Co.'s No. 6 Alliance Trust, 667 ft. E, 1,787 ft. S line of lease, Sec. 34-11s-1w.
T.D. 9,545 ft.; cutting screen and liner.

Hackberry—Cameron Parish

Calcasieu Oil Co.'s No. 5 Hansen, 2,529 ft. W, 803 ft. S of NE cor. of Sec. 14-12s-10w.
Drlg. shale 5,962 ft.

Gulf Refg. Co.'s No. 19 Erwin, 1,315 ft. W along S line of the SE cor. of Sec. and 960 ft. at R/A to S line, Sec. 12-12-10w.
Drlg. 8,000 ft.

Stanolind O. & G. Co.'s No. 15 Gulf Land, 1,650 ft. S, 750 ft. W from NE cor. SW¼ of Sec. 14-12s-10w.
Rig up.

Texas Co.'s No. 18 State, N 13 deg. 20 ft. W, 4,000 ft. from No. 13, Sec. 44-12s-9w.
Drlg. shale 2,298 ft.

New Iberia—Iberia Parish

Canal Oil Co.'s No. 2 Sabatier et al, 200 ft. NE along lease line from W cor. of Canal-Bernard lease in Sec. 54, thence NW at right angles of Sec. 53-12s-7e.
T.D. 2,802 ft.; 7-in. csg. 2,750 ft.; prepare to test.

Harrison & Abercrombie's No. 4 Schwing, Sec. 56-12s-7e.
Cutting and pulling screen at 6,789 ft.

Kitos Oil Co.'s No. 1 Sealy, Sec. 56-12s-7e.
Derrick.

Jennings—Acadia Parish

Abshire-Bolyard's No. 3 Clemonds, 3,500 ft. N, 95 ft. E of SW cor. Sec. 46.
Drlg. gumbo 2,160 ft.

Yount Lee Oil Co.'s No. 15 Houssiere-Latriele.
Drlg. shale 6,626 ft.

Lafitte—Jefferson Parish

Texas Co.'s No. 2 Rigolet Co-operative Co., 467 ft. S, 1,194 ft. W of NE cor. Sec. 30-19s-24e.
Drlg. sand 1,831 ft.

Lake Hermitage—Plaquemines Parish

Humble O. & R. Co.'s No. 1 State Land, 1,980 ft. E, 200 ft. N of Texas Gulf No. 6, Sec. 11-18s-25e.
T.D. 4,462 ft.; P.B. to 2,930 ft.; drlg. shale 3,831 ft.

Lake Barre—Terrebonne Parish

Texas Co.'s No. 34 State, Sec. 40-21s-19e.
10¾-in. csg. at 915 ft.; drlg. sand 2,020 ft.

Lake Pelto—Terrebonne Parish

Texas Co.'s No. 14 State, Sec. 8-23s-18e.
Drlg. water sand 6,158 ft.

Leesville—Lafourche Parish

Texas Co.'s No. 39 Leesville, 125 ft. S, 1,481 ft. W of NE cor. SE¼ of Sec. 27-21s-22e.
Rig up.

Texas Co.'s No. 38 L.L.&E., 201 ft. W and 292 ft. S of NE cor. of SE¼ of Sec. 27-21s-22e.
T.D. 4,937 ft.; 7⅝-in. csg. at 3,991 ft.; I.P. 1,621 bbls. per day, ½-in. choke.

Texas Co.'s No. 25 Leesville.
Derrick.

Texas Co.'s No. 23 Leesville, 975 ft. S, 1,-975 ft. W of NW cor. of SW¼ Sec. 26-21-22.
Derrick.

Texas Co.'s No. 32 Leesville, 890 ft. S, 2,484 ft. W of NE cor. SE¼ Sec. 27-21s-22e.
Abandoned 4,320 ft.

Lockport—Calcasieu Parish

Magnolia Pet. Co.'s No. 10 Farquhar, 200 ft. S, 200 ft. E of NW cor. SE¼ SE Sec. 5-16s-9w.
Drlg. sand 5,801 ft.

Roanoke—Jefferson Davis Parish

Glassel et al's No. 1 La. Irrigation Mill Co., 695.5 ft. E and 475 ft. N of SW cor. Sec. 1-9s-4w.
Location.

Humble O. & R. Co.'s No. 4 Kratzer, 75 ft. SN line, 375 ft. WE line of Sec. 11-4w-9s.
Drlg. shale and lime, 6,419 ft.

Humble O. & R. Co.'s No. 3 Kratzer, 1,323 ft. NS line, 440 ft. WE line of M. Kratzer 120-ac. tract, Sec. 11-9s-4w.
Drlg. shale and sand 7,840 ft.

Sweet Lake—Calcasieu Parish

Pure Oil Co.'s No. 13 Yount Lee, 800 ft. S, 66 deg. 42 ft. E of No. 12, Sec. 13-13.
T.D. 7,405 ft.; preparing to make D.S.T.

Sulphur—Calcasieu Parish

Union Sulphur Co.'s No. 814 fee, 2,666 ft. N, 411 ft. W of Center Sec. 29-9s-10w.
T.D. 3,725 ft.; 380 bbls. per day, ¼-in. choke.

White Castle—Iberville Parish

Shell Pet. Corp.'s No. 2 Shingle, 250 ft. S, 275 ft. E of NW cor. of Shingle lease Bldg. derrick.

Shell Pet. Corp.'s No. 8 Wilbert.
T.D. 6,042 ft.; I.P. 438 bbls. per day.

Shell Pet. Corp.'s No. 1 Adams, 2,340 ft. N, 100 ft. E of SW cor. of lease.
T.D. 8,942 ft.; I.P. 47 bbls. per day.

Miscellaneous Wildcats

TEXAS

Austin County

T. F. Wood et al's No. 1 Trenchman, 330 ft. from SE line of a 50-ac. tract, James Cummins Sur.
S.D. 750 ft.

Brazoria County

British-American Oil Prod. Co.'s No. 1 W R. Nash, 1,191 ft. E of W line, 335 ft. S of N line of Thos. Alsberry League.
Drlg. shale 1,310 ft.

Gulf Prod. Co.'s No. 1 Wilkes & Smith, 5,510 ft. W along N line of 850-ac. tract from NW cor. of 211-ac. tract, thence 990 ft. S at R/A James Hall Sur.
Drlg. shale 4,522 ft.

R. R. Osborne's No. 1 John L. Jones, 330 ft. each way out of N cor. of 8⅓ of Lot 7, Blk. 1, J. C. Smith Sur.
S.D. 20 ft.

Texas Co.'s No. 2 Freeport Sulphur Co., Conception Areola Sur.
Drlg. shale and bldrs. at 2,286 ft.

Burleson County

Carl Dyer et al's No. 1 C. W. Young, 750 ft. EW line, 330 ft. SN line of 140-ac. tract, John Byrd Sur.
Preparing to set surface csg. at 60 ft.

Red Bank Oil Co.'s No. 1 Q. B. Crain, 330 ft. from N and W lines of 140-ac. tract and W. C. Pierce Sur.
Location.

Chambers County

Black Gold Oil Co.'s No. 1 Borrow, 6,433 ft. NW of the SE line, 3,080 ft. SW of NE line, Ruben Borrow Sur.
Rig up.

Salt Dome Oil Co.'s No. 1 A. B. Lawrence, James Grant Sur., 2,650 ft. NW of SE. line, 6,060 ft. SW of NE line.
T.D. 7,005 ft., cored salt water sand from 6,820-25 ft.

South Gulf Oil Co.'s No. 1 J. T. White, 1,653 ft. from E line, 466 ft. from S line of 1,476-ac. tract, James McGahey Sur.
Location.

Stanolind O. & G. Co.'s No. 1 A. B. Middleton, 426 ft. from W line, 466 ft. from S line of A. D. Middleton 120-ac. tract, Shadrock Burney Sur.
Derrick.

Calhoun County

Continental Oil Co.'s No. 2 American National Realty Co., 660 ft. from NW line, 666 ft. from NE line of Sec. 6, Blk. C, Pedro Garcia Sur.
Cut 6-in. csg. 7,114 ft.; will sidetrack.

Humble O. & R. Co.'s No. 1 Mrs. Eliza Welder, 5,685 ft. S, 55 deg. W from a part of intersection of St. L.B.&W. & R.R. Sur. and NW line of Jose Maria Rios Sur., 7,210 ft. S, 35 deg. E at R/A Gardner Smith Sur.
Moving in.

Colorado County

Coyle & Concord's No. 1 fee, 550 ft. from N line, 1,950 ft. from E line of Sec. 46, I.&G.N. Sur.
10¾-in. csg. 610 ft.; T.D. 698 ft.

Fort Bend County

Bunte O. & G. Co.'s No. 1 A. P. Georges, 4,132 ft. NW along SW line from S cor. of survey, thence due N 1,330 ft., thence due E 2,970 ft., thence due N 330 ft. to location, approx. 2,100 ft. NW along SW line from S cor. of survey and 2,750 ft. NE at right angles, J. Jones Sur.
Drlg. shale 3,500 ft.

Texas Gulf Prod. Co.'s No. 1 E. B. Winston, 1,490 ft. E of W line, 228 ft. N of S line of 350-ac. tract, S. Isaacs Sur.
Drlg. shale 7,467 ft.

Galveston County

Sun Oil Co.'s No. 1 J. D. Hughes, 1,666.5 ft. NW line, 1,312 ft. NE line of W. M. C. Baker Sur.
Drlg. shale 1,510 ft.

Grimes County

Dr. Marshall et al's No. 1-B Todd, 800 ft. from E line and 175 ft. from N line of 150-ac. tract in extreme NW cor. of county (25 ft. N of No. 1).

7-in. csg. 2,678 ft.; T.D. 2,815 ft.; could not bail fluid down in csg.; bailing.

Harris County

Cockburn Oil Co. and Stanolind O. & G. Co.'s No. 1 J. B. Hines, 7,817 ft. NB line and 330 ft. EW line of survey, A. McCormick Sur.
Abd. 5,785 ft.

A. C. Hill's No. 1-A Swilley 5,426 varas E of W line and 1,960 varas N of S line of Sur.-C. Victor Blanco Sur.
Rig up.

A. C. Hill's No. 1-B Swilley 6,141 varas E of W line, 1,960 varas N of S line of Sur., center of 200-ac. lease, 365 varas S of N line and 773 varas W of E line of lease, Victor Blanco Sur.
Rig up.

E. E. Young, tr.'s No. 2 P. S. Griffith, 3,476 ft. S of N line, 2,030 ft. E of W line of A. R. Bodman Sur.
T.D. 4,360 ft.; S.D.

Hardin County

Frank Beaudoin et al's No. 1 Walton, A. L. Lancaster Sur.
S.D. 1,900 ft.

Houston County

A. H. Smith et al's No. 1 Smith Bros., S 55 deg., W 973 ft., S 36¾ deg., E 1,409 ft., J. H. Cummings League.
8¼-in. csg. at 420 ft., drlg. 900 ft.

Zeni Oil Co.'s No. 1 Houston County Timber Co., I.&G.N. Sur.
Drlg. shale 5,242 ft.

Jackson County

L. A. Douglas' No. 1 I. N. Mitchel, 750 ft. W, 150 ft. N from NW cor. of A. F. Mitchell 100-ac. tract, Lolita area, S. F. Austin Sur.
Moving in.

Jefferson County

Humble O. & R. Co.'s No. 1 R. C. Miller et al, 1,399 ft. S, 460 ft. W from NE cor. of Blk. No. 7, Garden Villas Subd., approx. 6,650 ft. WE line, 5,500 ft. NS line of survey, A. Savery Sur.
Drlg. sandy shale 2,250 ft.; 10¾-in. at 1,992 ft.

Humble O. & R. Co.'s No. 1-B McFaddin, C. T. Cade Sur., 330 ft. from S and W lines of the E 240-ac. tract.
Coring sand 5,710 ft.

Sun Oil Co.'s No. 1 Herbert & Braussard, 6,890 ft. NW along SW line and 660 ft. NE at R/A to SW line, B. Blackman Sur., Abst. No. 2.
Shale 8,282 ft.; 9⅝-in. csg. 8,210 ft.; prepare to deepen.

Tatum and Pendergrass No. 1 B. W. Owens, 160 ft. E of W line and 325 ft. S of N line of Lot No. 3, Blk. 9, Range 9, Port Arthur Land Co. subdv., Joseph Grigsley Sur.
Drlg. shale 997 ft.

Matagorda County

Continental Oil Co.'s No. 1 Feife, J. S. Criswell Sur., 3,000 ft. E of W line, 2,800 ft. N of S line of survey.
T.D. 7,490 ft.; S.D.

Hammon Exploration Co.'s No. 1 Cleveland, 330 ft. NS line, and WE line of 48-ac. tract, E. Hall Sur.
Drlg. shale 5,437 ft.

Helmerich & Payne's No. 1 Hawkins, 850 ft. S, 70 deg. W of Cockburn Oil Co.'s No. 6 Hawkins.
Coring shale 6,450 ft.

Horace M. Smith, Inc.'s No. 1 Wadsworth ranch, 150 ft. out of S cor. of Lot No. 8, S. R. Fisher Sur.
T.D. 8,853 ft.; ran screen and liner, flows by heads, making oil and salt water.

Sterling O. & R. Co.'s No. 1 Baer Estate, 5,274 ft. SW of S cor. of Van Dorn and Bales Sur., 400 ft. NW at right angles in Samuel Hart Sur.
T. D. 1,830 ft.; 10¾-in. csg. set at 1,830 ft.; W.O.C.

Sun Oil Co.'s No. 1 Craig, 1,546.9 ft. SW from N cor. along NW line of lease and survey, thence 157.2 ft. SE at right angles in Thomas Williams Sur.
Drlg. rock 479 ft.

Montgomery County

W. M. S. Thomson's No. 1 Scott, 1,191 ft. SN line, 482 ft. WE line, 1,623 ft. EW line of the F. A. B. Wheeler Sur.
T.D. 3,674 ft., 7-in. csg. 3,340 ft.

Orange County

Blue Line Oil Co.'s No. 1 J. E. Peet Richard, 900 ft. W of E line and 150 ft. S of N line of most easterly NE cor. of 138-ac. tract, Bailey Sur.
Drlg. sandy shale 2,072 ft.

Coker Oil Co.'s No. 1 S. T. Mansfield, 500 ft. S, 500 ft. W from NE cor. of 80-ac. tract, J. W. Hall Sur.
S.D. 1,280 ft.

Smith & Ellis' No. 1 Pell.
T.D. 2,095 ft.; changing rigs.

Polk County

Perry Morgan et al's No. 1 K. H. Root, L. Costillian Sur.
Drlg. shale 450 ft.

Refugio County

Cecil Hagen et al's No. 1 Edith Clarkson, 1,736 ft. from N line, 3,820 ft. from E line of J. Coughlin Sur.
Location.

San Jacinto County

Cockburn Oil Corp.'s No. 1 H. H. Lockin, 2,214 ft. W of E line, 295 ft. S of N line of H. H. Lockin 1,954-ac. tract, W. M. Hayes Sur.
Rig up.

Darby-Jones-McBee, Drlg. Co.'s No. 1 Bennett D. Beer Sur.
P.B. to 2,500 ft.

J. E. Hooper et al's No. 1 R. R. Love, 475 S of N line, 2,000 ft. W of E line, 177-ac. tract, Drury McGee Sur.
Rig up.

Victoria County

Heep Oil Corp.'s No. 1 J. J. Welder, 300 ft. SW line, 750 ft. from SE line of Nursery area, Phillip Graves Sur.
Location.

Shell Pet. Corp.'s No. 2 McFadden, 11,350 ft. from NE cor. along N line, 2,310 ft. S of N line at R/A.
Bldg. Derrick.

Welder Oil & Gas Co.'s No. 1 Patrick, 3,230 ft. SW, 1,925 ft. NW of most easterly cor. of 1,730-ac. tract, Felipe Dem-mit Sur.
Drlg. shale 1,000 ft.

Wharton County

Pure Oil Co.'s No. 1 Paige, 1,397 ft. NE and 467 ft. SE from W cor. of 159.27-ac. lease, James Pirie Sur.
Drlg. sandy shale 6,262 ft.

Sterling Oil & Ref. Co.'s No. 1 Frank Janik Sr., 1,859 ft. from N line, 467 ft. W from SE cor. of Janik tract, Johathan Scott Sur.
T.D. 8,667 ft.; 5-in. csg. at 7,831 ft.; P.B. to 7,875 ft., flowing by heads, making oil and salt water.

Texas Co.'s No. 1-C Pierce Est., 12,225 ft. W along S line of the W. M. Pettus Sur., 3,400 ft. N in the John Caldwell League.
Drlg. shale and sand 6,174 ft.

SOUTH LOUISIANA

Beauregard Parish

Richardson & Martin's No. 1 Southwest Lbr. Co.
Location.

Calcasieu Parish

Fred Oil Co.'s No. 2 Faist, 262 ft. E and 8 ft. S of NW cor. SE¼ Sec. 26-8s-10w.
S.D. 4,051 ft.

Wheeler Oil Corp.'s No. 1 School Lot, 1,708 ft. E, 1,325 ft. N of SW cor. Sec. 16-9s-7w.
Drlg. shale 7,189 ft.

Cameron Parish

Magnolia Pet. Co.'s No. 1 J. B. Broussard, 330 ft. E and S, out of NW cor. of the SW¼ of SE¼ of Sec. 13-12s-9w.
T.D. 9,499 ft., running csg. to test.

Steinberger Pet. Co.'s No. 1 Drew, 330 ft. out of NW cor. NE¼ of Sec. 26-10s-11w.
Location.

Evangeline Parish

J. E. Ladue's No. 4 Vidrien, Sec. 34-3-2.
S.D. 1,635 ft.

Sparks-Mitchell and Jacobson's No. 1 Vidrine, 1,114 ft. S, 1,060 ft. W of NE cor. Sec. 47-4s-2e.
Shale 1,618 ft.; no report.

East Feliciana Parish

Thompson Creek Oil Co.'s No. 1 Fannie Noland, 2,600 ft. E and 1,580 ft. N of SW cor. Sec. 70.
S.D. 1,589 ft.

Iberia Parish

Jefferson Lake Oil Co.'s No. 1 State, Twp. 12s-5e.
T.D. 8,545 ft., cutting and pulling drill stem.

Meade Oil Co.'s No. 1 Hamilton, near town of Loze, in the NW cor. of parish, Sec. 33-12-5.
S.D. 200 ft.

Texas Co.'s No. 1 State Fausse Point.
Drill stem stuck at 6,400 ft.; fishing.

Jefferson Davis Parish

Shell Pet. Corp.'s No. 1 Lacassan, 990 ft. N, 1,980 ft. E of SW cor. of Sec. 20-11s, 5w.
Coring shale 6,520 ft.

LaFourche Parish

Coastal Oil Co.'s No. 2 Constantine, 1,476 ft. N, 809 ft. E of SW cor. Sec. 36-21-22e.
Location.

St. Bernard Parish

F. F. Kramer's No. 1 Robinson, 300 ft. S, 200 ft. W of NE cor. of Sec. 78-14s-14e.
T.D. 100 ft.; reported slight gas show, shut down.

Emerald Pet. Corp.'s "Shell Beach Properties" No. 1, on S edge of Bayou Louis, Sec. 31-13s-15e.
T.D. 7,385 ft.; hole caved in while S.D. at 5,480 ft.; cemented 7-in. csg. at 5,480 ft.

St. Mary Parish

Herton Oil Co.'s No. 1 Roame, 1,386 ft. N, 658 ft. E, SW cor. of Lot 13, Sec. 33-13s-9e.
Drlg. shale and sand 5,407 ft.

St. Martin Parish

Texas Co.'s No. 1 State Lake, 5,130 ft. E, 350 ft. N of SW cor. of Sec. 10-10s-9e.
T.D. 5,835 ft.; S.D.

Tide Water Oil Co.'s No. 1 Smedes, 990 ft. from N and E lines of 1,000-ac. tract, Sec. 57-11e-6w.
T.D. 5,582 ft., shut in after flowing oil and gas.

Plaquemines Parish

Lo-Tex Expltn. Co.'s No. 1 Hero Plantation.
Sec. 73-14s-24e.
5,348 ft., shut down.

Southern Sulphur Co.'s No. 1 Manhattan Fruit Co.
Drlg. sandy shale 3,042 ft.

Rapides Parish

Amerada Pet. Corp.'s No. 1 Wells Land Co., 490 ft. from W line, 2,460 ft. from S line of Sec. 53-1s-3e.
T.D. 6,837 ft., plugging back to test from 6,722-32 ft.

St. Tammy Parish

Danciger O. & R. Co.'s No. 1 Holdsworth, C NW¼ SE¼ Sec. 26-8s-14e.
Drlg. shale 1,550 ft.

Vermillion Parish

Delcambre & Shelton's No. 1 Adam Delcambre, south degrees E, 825 ft. from most northerly cor. of irregular Sec. 63-17-5.
S.D. 2,611 ft.

Terrebonne Parish

Dulac Oil Co.'s No. 1 Bourg, Sec. 10-20-17e.
S.D. 4,072 ft.

Shell Pet. Corp.'s No. 1 Realty Operators, 2,000 ft. due S of E cor. of triangular Sec. 76, Sur. 102, 17s-17e.
Drlg. sand 1,353 ft.

E. C. TEXAS WILDCATS

Week Ending November 9

Cayuga Area—Anderson County

Tide Water Oil Co. et al's No. 21-A Wills, 4,079 ft. N and 2,333 ft. W of lease, S. Edmondson Sur. (Trinity test).
T.D. 9,085 ft.; P.B. to 8,746 ft.; plugged back to 7,395 ft., shot 100 shots in csg. 7,210-7,300 ft.; testing.

Long Lake Area—Anderson County

Tide Water Oil Co. et al's No. 3 Shaw & Cern, 933 ft. W of No. 1, D. Parker Sur.
Rigged up.

Standard Oil Co. of Kansas' No. 1 Robinson & Hombs, 2,300 ft. from W and midway of N and S lines of lease, J. Adams Survey.
Rig.

Angelina County

Burnham et al's No. 1 Norton Properties, 700 ft. NW cor. and 600 ft. from E of W. M. Johnson Sur., 8 miles SW of Zavala in SE part of county.
S.D. 612 ft.

D. J. Le Blanc's No. 2 C. L. Dupuy, 800 ft. from S and 500 ft. from E of NW cor. of Blk. 48, H.T.&B. Sur., 4½ miles S of Huntington.
S.D. 1,472 ft.

Morris et al's No. 1 Pruyear, cen. 165-ac. tract, Thos. Hank Sur., 7 miles E of Huntington.
Derrick.

Pioneer Exp. Co.'s No. 1 J. A. Rose, 300 ft. SE and 200 NE of J. H. White 80-ac. tract, Sarah O'dell Sur.
Coring 1,252 ft.

Pioneer Exploration Co.'s No. 1 Mrs. Willroy, 700 ft. N line of D. C. Welsh Sur., and center of E and W lines of Sur., ¼ mile NW of Huntington.
Elev. 312 ft.; S.D. 1,429 ft.; making about 12 bbls. per day; gr. 25 deg.

Bowie County

B. J. Russell's No. 1 O. A. Hall, 2,350 ft. W line and 1,100 ft. S line of R. F. Peters Sur., SW cor. of county.
Rigged up.

Tex-Ark. Oil Co.'s No. 1 Hamilton Estate, 600 ft. E and 350 ft. N lines, J. Milan Sur., 4 miles S of Red River.
S.D. 1,121 ft.

Woodley & Bentley's No. 1 Lumpkin, 330 ft. out of NE cor. of 345-ac. tract, J McDermot Sur., 1 mile SW of Dalby Springs.
S.D. 120 ft.

Camp County

E. J. Moran's No. 1 Wm. Mitcham Est., 660 ft. from N and W of 100-ac. tract, L. Rose Sur., 2 miles N of Newsome.
Elev. 443 ft.; Top Austin 3,850 ft.; cored from 4,302-20 ft.; S.D. for orders, 17 ft. gray ashy sand.

E. R. Smith et al's No. 1 J. M. Jordan, 3,000 ft. from S and 1,100 ft. from E. B. Allen Sur., 1 mile S of Newsome.
Elev. 438 ft.; top Woodbine 4,267-83 ft.; S.D. 4,385 ft.

Cherokee County

Wilson Stubbs Oil Co.'s No. 1 Rowborts, 450 ft. from S line, 150 ft. from W line of 100-ac. tract, 2 miles SW of Jacksonville, J. D. Wolfin Sur.
S.D. 1,555 ft.

Collin County

Port Bolivar O. & R. Co.'s No. 1-A Dunning, 24 ft. W of No. 1, Wm. Creager Sur., 2 miles SE of Van Alystin.
Elev. 722 ft.; drlg. 3,612 ft.

Port Bolivar O. & R. Co.'s No. 1 J. Shirley, 330 ft. N and W of 310-ac. tract, J. Sorrell Sur., 4 miles SE of Anna.
Elev. 684 ft.; S.D. 1,962 ft.

Ellis County

Beasley O. & G. Co.'s Inc.'s No. 1 E. Roller, 1,000 ft. from NW and 1,500 ft. from SW line of Sur.
S.D. 160 ft.

Fannin County

Warner Moore et al's No. 2 Hancock Est., 1,200 ft. N and 500 ft. E of L. M. Baldock Sur., 1 mile E of Trenton.
Location.

Warner Moore et al's No. 1 Hancock, 400 ft. from W and 150 ft. N lines, Sec. 16, L. M. Baldock Sur., ½ mile S of Trenton.
Top sand 645 ft.; S.D. 689 ft.

R. Franklin Smith-Allen's No. 1 Argo, center of 16½-ac. tract in J. G. Swisher Sur.
S.D. 1,393 ft.

Freestone County

J. J. Leighton et al's No. 1 G. Cochran, 330 ft. from N and W of 100-ac. tract, D. Bullock Sur., 6 miles S of League, Austin 3,875 ft.; drlg. 4,206 ft.

Grayson County

Olson Drlg. Co.'s No. 1 Southwestern Life Ins. Co., center of 160-ac. tract and J. C. Jamison Sur., 6 miles NW of Denison.
Elev. 767 ft.; drlg. 2,815 ft.

Port Bolivar O. & R. Co.'s No. 1 C. Taylor, 330 ft. S and W of 1,543-ac. tract, Fitzhugh Sur., 2¼ miles SE of Gunter.
Drlg. 2,932 ft.

Gregg County

C. L. Porter's No. 1 Mrs. F. G. Glover, 330 ft. N and 1,320 ft. from E line of Geo. Melton Sur. in SW cor. of county.
Derrick.

Henderson County

C. & G. Oil Co.'s No. 1 Sterrett, 350 ft. from S and 200 ft. from W of Isham Marshall Sur.
Drlg.

Kirby Pet. Co.'s No. 1 C. L. Litchfield, 600 ft. N and 350 ft. W, I. Clendennen Sur.
S.D. 4,122 ft.; P.B. 4,064 ft.; ran tubing.

H. M. Wilson's No. 1 fee, 970 varas S of NE cor. of 943-ac. tract, 5 miles N of Malakoff.
Derrick.

Hill County

Roger Lacey et al's No. 1 J. H. Atchison Est., 330 ft. S and E of E. Carroll Sur., 5 miles W of Hillsboro.
Derrick.

Hunt County

J. F. Morrissey & Co., Inc.'s No. 1 Fry, 543 ft. from N and 200 ft. from E of 146-ac. tract, 7 miles N of Commerce.
C. Davis Sur.
T.D. 4,407 ft.

Kaufman County

Murry & Emerson's No. 1 G. W. Martin, 1,660 ft. from W and 20 ft. from N of 140-ac. tract, from W, L. C. Butler Sur., 2 miles NE of Kemp.
Top Austin 1,940-74 ft.; S.D. 2,240 ft.

Lamar County

Bruce Brothers' No. 1 Chas. Price, 2,640 ft. S and 3,960 ft. from E line of Wm. Nelson Sur., 10 miles NE of Paris, 1 mile W of Trout.
S.D. 336 ft.

L. W. Dennis' No. 1 W. C. Clark, 800 ft. from E and 1,800 ft. from N line of G. H. Hall Sur., 3 miles NE of Reno.
Derrick.

L. W. Dennis, trustee's No. 1 Mrs. R. Lawrence, 300 ft. from N and 1,160 ft. from W of T. B. Roundtree Sur., 2 miles NE of Blossom.
Derrick.

Texas-Gulf Pet. Co.'s No. 1 A. L. Darnell, 1,490 varas from S and 1,080 varas from W line of H. L. Williams Sur., 4 miles NE of Paris.
S.D. 2,620 ft.

North Texas Synd., Eric T. Bradley, tr.'s No. 1 Wright, Alfred Moore Sur., 1,600 ft. S and 4,300 ft. from E line of Sur.
S.D. 2,579 ft.

Leon County

Tide Water Oil Co. et al's No. 1-A Carter, 500 ft. due E and 2,150 ft. N of SW cor. of lease in S. Sanchez Sur. No. 7.
Austin 4,630-4,920 ft., coring 5,327 ft.

Limestone County

D. Crawford's No. 1 Mary Ward, 150 ft. out of NE cor. 28-ac. tract, P. Varella Sur.
Tested mud 3,001 ft.

McLennan County

T. Cunningham's No. 1 M. G. McKee, 940 ft. from S and 2,640 ft. W of 640-ac. tract, M. Snell Sur., near Bruceville.
Derrick.

Riley & Barrow's No. 1 Hortsman, V. C. Walters Sur., 500 ft. from most northerly N line, 500 ft. from most westerly E line, 500-ac. tract, 1½ miles S McGregor.
S.D. 475 ft.

Nacogdoches County

Rosser Bros. & Jackson's No. 1 Mattby, 330 ft. out of NE cor. 60-ac. tract, Pedro J. Esparza Sur., 5 miles S of Nacogdoches.
S.D. 565 ft.

Navarro County

McCullough et al's No. 1 C. Berry, 330 ft. from SE cor. of 35-ac. tract, 1 mile W of Blooming Grove, William Moss Sur.
S.D. 1,500 ft.

E. M. Thomason's No. 1 T. P. Shivers, 1,500 ft. from W. and 600 ft. N. of 69-ac. tract, W. R. Bowen Sur., 2 miles S. of Corsicana.
S.D. 1,287 ft.

Rains County

Allen & McClung's No. 1 Giles, T. Cunningham Sur., Abst. 143, 330 ft. from W line and 200 ft. from N line of 105-ac. Giles tract, 5 mi. SW of Emory.
Derrick.

Allen & McClung's No. 1 Ida Bullard,

N. Brantely Sur., 1,300 ft. from W line and 200 ft. from N line of 35-ac. tract 3 mi. SW of Emory.
Derrick.

Allen & McClung & Collard's No. 1 S. P. Cain, 1,350 ft. N and 1,550 ft. W line of J. Harges Sur., 1 mile NW of Emory.
Location.

Red River County

Don F. Cleary's No. 1 C. S. Mowery, 150 ft. from S and 3,300 ft. W of most easterly E line of J. Bowerman Sur., 10 miles N of Clarksville.
Cored oil sand 1,130-50 ft.; 2 gallons asphalt; T.D. 1,144 ft.

Joe Dinger et al's No. 2 Morris, John Guest Sur., approx. 175 ft. NW of No. 1 Morris, 1 mile S Detroit.
S.D. 640 ft.

R. H. Chew et al's No. 1 J. F. Brooks, 900 ft. N and 600 ft. of W line of 320-ac. tract, B. Gooch Sur., ½ mile S of Bagwell.
Derrick.

Joiner's No. 1 D. Rust, C. C. Wilborn Sur., 334 ft. N and 254 ft. W of most southerly SE cor. of Sur., just south of Avery.
Derrick.

Rockwall County

Dodd et al's No. 1 M. F. Lofland, 2,250 ft. from N and 3,250 ft. from E line of 392-ac. tract, W. H. Baird Sur., 2¼ miles SE of Rockwall.
S.D. 192 ft.

Rusk County

Agey Drlg. Co.'s No. 1 John McWilliams Est., 330 ft. out of NW cor. of 240-ac. tract in J. C. De Lavina Sur.
Drlg. 3,449 ft.

W. Shipman et al's No. 1 Citizens Natl. Bank, NE cor. of 125-ac. tract, J. J. D'Barbo Sur., 4 miles NE of Henderson.
Elev. 432 ft.; drlg. 2,000 ft.

Titus County

Rotondi's No. 1 Lillianstun, 1,200 ft. E from NW cor. of J. Bodt Sur. and 330 ft. N. but in W. H. Crawford Sur., 5 miles NE of Talco.
Elev. 301 ft.; derrick.

Upshur County

E. S. Holman's No. 1 J. Daniels, 330 ft. from S and W of 47.5-acre tract, 5 miles W of field and 3 miles W of Prichett, Ira Stephenson Sur.
Coring 3,712 ft.

Van Zandt County

J. H. Gilliam et al's No. 1 E. S. Martin, 185 ft. most southerly SE line, and 208 ft. from most easterly SW line of tract, James Hamilton Sur., 3 miles NE of Wills Point.
Location.

Pioneer Exploration Co.'s No. 1 B. Spruce, 330 ft. out of SE cor. of 50-ac. tract, in J. Denman Sur., 8 miles S of Canton.
Top Austin 3,540 (broken) 3,590 (hard); Drlg. 4,090 ft.

Wood County

Westgate Oil Co.'s No. 1 West Lake Hunting and Fishing Club, 660 ft. from S and E of 428.6-ac. tract, M. Rentarariz Sur., 14 miles E of Mineola.
Rigged up.

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Shell Oil Co., No. 8 Capitan, Santa Barbara Co.	5- 4-30	3,242	dry; abd.
Shell Oil Co., No. 9 Capitan, Santa Barbara Co.	5- 4-30	2,713	flow. 241 b.d.
General Petroleum, No. 16 Capitan, Santa Barbara Co.	32- 5-30	323	suspended
Shell Oil Co., No. 2 Goleta, Santa Barbara Co.	10- 4-29	3,196	sd. sh. drlg.
Honolulu Oil Corp., No. 9 Elwood, Santa Barbara Co.	tideland	4,500	rd. sh. drlg.
Barnsdall-Rio Grande, No. 12 Elwood, Santa Barbara	15- 4-29	6,702	cmtd. 3,900
Barnsdall-Rio Grande, No. 6 Elwood, Santa Bar ara.	15- 4-29	3,481	P.B. 3,210
Barnsdall-Rio Grande, No. 2 Elwood, Santa Barbara.	15- 4-29	6,492	P.B. 3,836
Bankline Oil Co., No. 10 Elwood, Santa Barbara Co.	tideland	3,835	redrlg. 3,270
Pacific Western, No. 16 Elwood, Santa Barbara Co.	tideland	2,781	sd. sh. drlg.
Spalding, Caroline, No. 13 Elwood, Santa Barbara Co.	tideland	....	Ldg. fdn.
Field, O. C., No. 1 Santa Maria, Santa Barbara Co.	28-10-33	1,585	sd. sh. drlg.
Freeman, M. J., No. 1 Purisima, Santa Barbara Co.	11- 7-33	1,450	bailing
Mar Monte Oil Co., No. 1 Summerland, Santa Barbara	16- 4-26	951	sd. sh. drlg.
Santa Barbara Oil, No. 1 Carpinteria, Santa Barbara	29- 4-25	286	sd. sh. drlg.
Dietzman, Julius, No. 1 Carpinteria, Santa Barbara Co.	8- 4-25	....	rigged up
Las Posas Pet., No. 1 Las Posas, Ventura Co.	22- 3-20	8,116	P.B. 6,400
Union Oil Co., No. 1 Bardsdale, Ventura Co.	12- 3-20	5,165	sd. sh. drlg.
Monticello Oil Co., No. 1 Bardsdale, Ventura Co.	12- 3-20	4,011	suspended
Duke Oil Co., No. 1 Bardsdale, Ventura Co.	7- 3-19	....	bldg. rig
The Texas Co., No. 1 Fillmore, Ventura Co.	29- 4-19	5,297	hd. sd. drlg.
Laying & Jacobs, No. 1 Shiells Canyon, Ventura Co.	32- 4-19	1,006	sd. sh. drlg.
El Rancho Oil Co., No. 1 South Mountain, Ventura Co.	9- 3-19	1,110	cleaning out
Bankline Oil Co., No. 1 South Mountain, Ventura Co.	3- 3-19	3,634	flow 650 b.d.
Hull, James, No. 1 Susana, Ventura Co.	2- 2-18	1,150	sd. sh. drlg.
Bolsa Chica Oil Co., No. 1 Temescal, Ventura Co.	4- 4-18	2,620	deepening
Ventura Expl. Co., No. 1 Saticoy, Ventura Co.	30- 3-22	7,068	will perf.
Prop. Service Corp., No. 1 Lloyd, Ventura Co.	24- 3-23	9,582	P.B. 9,528
General Pet., No. 1 Oxnard, Ventura Co.	26- 2-23	7,625	P.B. 5,775
General Pet., No. 3 Rincon, Ventura Co.	tideland	697	sd. sh. drlg.
Honolulu Oil Corp., No. 2 Rincon, Ventura Co.	tideland	700	sd. sh. drlg.
Continental Oil Co., No. 1 Ojai, Ventura Co.	12- 4-23	....	bldg. rig
Continental Oil Co., No. 5 San Miguelito, Ventura Co.	15- 3-24	....	rigging up
C. C. M. Oil Co., No. 1 San Miguelito, Ventura Co.	23- 3-24	7,906	P.B. 7,652
Standard Oil Co., No. 1 Lost Hills, Kern Co.	2-26-29	5,824	recmtd. 5,766
Cumberland Oil Co., No. 1 Devil's Den, Kern Co.	17-26-28	3,540	sd. sh. drlg.
Belmac Drlg. Co., No. 1 McKittrick, Kern Co.	22-29-21	4,374	hd. sd. drlg.
Belmas Drlg. Co., No. 2 McKittrick, Kern Co.	21-29-21	352	suspended
Big McKittrick Oil Co., No. 1 McKittrick, Kern Co.	20-30-22	622	suspended
Bering, R. E., No. 1 McDonald, Kern Co.	12-28-19	986	sd. sh. drlg.
General Pet. Co., No. 1 South Belridge, Kern Co.	20-28-21	11,277	suspended
Standard Oil Co., No. 2 North Belridge, Kern Co.	26-27-20	8,200	flow. 8,200 b.d.
Standard Oil Co., No. 3 North Belridge, Kern Co.	26-27-20	7,464	br. sh. drlg.
Belridge Oil Co., No. 32-25 North Belridge, Kern Co.	25-27-20	7,961	cmtd. 7,958
Belridge Oil Co., No. 48-25 North Belridge, Kern Co.	25-27-20	4,192	sd. sh. drlg.
Continental Oil Co., No. 6 North Belridge, Kern Co.	26-27-20	7,550	hd. sh. drlg.
Union Oil Co., No. 19 North Belridge, Kern Co.	26-27-20	8,340	hd. sd. drlg.
Union Oil Co., No. 20 North Belridge, Kern Co.	26-27-20	8,321	br. sh. drlg.
Beck, Albert, No. 1 North Belridge, Kern Co.	25-28-20	125	sd. sh. drlg.
Ohio Oil Co., No. 1 Maricopa Flats, Kern Co.	11-11-22	6,258	sd. sh. drlg.
Woods & Bailey, No. 1 McFarland, Kern Co.	16-26-26	2,490	suspended
Standard Oil Co., No. 1 Delano, Kern Co.	1-25-23	2,455	gas; shut in
Standard Oil Co., No. 2 Delano, Kern Co.	1-25-23	3,256	gas; shut in
Standard Oil Co., No. 4 Delano, Kern Co.	34-24-23	2,460	gas; shut in
Standard Oil Co., No. 5 Delano, Tulare Co.	33-24-23	2,466	gas; shut in
Trico Oil & Gas Co., No. 1 Delano, Kern Co.	2-25-22	2,525	gas; shut in
Trico Oil & Gas Co., No. 3 Delano, Kern Co.	36-24-22	4,835	suspended
Trico Oil & Gas Co., No. 5 Delano, Kern Co.	3-25-23	2,467	gas; shut in
Richardson & Heaston, No. 1 Kern Front, Kern Co.	5-28-28	2,567	suspended
McDonald & Deavin, No. 1 Kern Front, Kern Co.	10-28-27	231	suspended
National Oil Co., No. 2 Kern Front, Kern Co.	11-28-27	1,596	sd. sh. drlg.
Associated Oil Co., No. 6 Kern Front, Kern Co.	4-28-27	....	rigged up
Oil Factors, Inc., No. 1 Kern Front, Kern Co.	6-28-27	....	rig; suspended
C. C. M. Oil Co., No. 8 Kern Front, Kern Co.	22-28-27	2,090	pump. 180 b.d.
C. C. M. Oil Co., No. 9 Kern Front, Kern Co.	22-28-27	....	rig; suspended
C. C. M. Oil Co., No. 10 Kern Front, Kern Co.	23-28-27	....	rig; suspended
Kreighs, C. H., No. 1 Kern Front, Kern Co.	4-28-27	1,297	sd. sh. drlg.
Republic Petroleum, No. 6 Kern Front, Kern Co.	24-28-27	....	location.
Standard Oil Co., No. 5 Kern Front, Kern Co.	5-28-27	2,821	bailing
Standard Oil Co., No. 6 Kern Front, Kern Co.	5-28-27	....	rigging up
Standard Oil Co., No. 7 Kern Front, Kern Co.	5-28-27	....	bldg. rig
The Texas Co., No. 1 Kern Front, Kern Co.	23-28-27	....	bldg. rig
Ambrican Naphtha Oil, No. 1 Kern Front, Kern Co.	21-28-28	1,365	deepening
Barnsdall Oil Co., No. 5 Mountain View, Kern Co.	22-29-29	1,961	sd. sh. drlg.
Barnsdall Oil Co., No. 6 Mountain View, Kern Co.	20-30-29	2,193	sd. sh. drlg.
Gilmore-Snyder, No. 2 Mountain View, Kern Co.	24-30-28	5,411	cmtd. 5,194
Canal Oil Co., No. 1 Mountain View, Kern Co.	20-30-29	5,810	fish. D.P.
Union Oil Co., No. 18 Mountain View, Kern Co.	23-30-28	2,922	sd. sh. drlg.
Hancock Oil Co., No. 8 Mountain View, Kern Co.	14-30-28	5,096	redrlg. 2,737
Hancock Oil Co., No. 9 Mountain View, Kern Co.	14-30-28	....	rig; suspended
Hogan Pet. Co., No. 7 Mountain View, Kern Co.	4-31-29	5,754	sd. sh. drlg.
Hogan Pet. Co., No. 8 Mountain View, Kern Co.	32-30-29	2,762	sd. sh. drlg.
Buffalo Oil Co., No. 1 Mountain View, Kern Co.	19-30-29	....	bldg. rig
Vesta Pet. Co., No. 2 Mountain View, Kern Co.	19-30-29	....	bldg. rig
Wood-Callahan Oil Co., No. 1 Mountain View, Kern Co.	30-30-29	5,680	will dpn.
O'Kane & Brain, No. 2 Mountain View, Kern Co.	20-30-29	....	rig; suspended
Mohawk Oil Co., No. 14 Mountain View, Kern Co.	20-30-29	5,552	cmtd. 5,480
Mohawk Oil Co., No. 15 Mountain View, Kern Co.	20-30-29	4,725	sd. sh. drlg.
Mohawk Oil Co., No. 16 Mountain View, Kern Co.	30-30-29	....	rigging up
Ohio Oil Co., No. 1 Mountain View, Kern Co.	32-30-29	5,999	redrlg. 4,320
Shell Oil Co., No. 5 Mountain View, Kern Co.	22-30-29	5,392	sd. sh. drlg.
Standard Oil Co., No. 12 Mountain View, Kern Co.	23-30-28	5,565	swabbing
Standard Oil Co., No. 14 Mountain View, Kern Co.	24-30-28	5,252	sd. sh. drlg.
Standard Oil Co., No. 15 Mountain View, Kern Co.	13-30-28	3,995	sd. sh. drlg.
Standard Oil Co., No. 16 Mountain View, Kern Co.	13-30-28	1,075	sd. sh. drlg.
Standard Oil Co., No. 17 Mountain View, Kern Co.	24-30-28	4,963	sd. sh. drlg.
Standard Oil Co., No. 18 Mountain View, Kern Co.	24-30-28	3,844	sd. sh. drlg.
Treasure Oil Co., No. 1 Mountain View, Kern Co.	12-30-28	....	bldg. rig
Mountain View Oil Co., No. 1 Mountain View, Kern Co.	25-30-28	5,650	cleaning out
Jergins Trust, No. 5 Mountain View, Kern Co.	24-30-28	5,761	redrlg. 5,654
Jergins Trust, No. 6 Mountain View, Kern Co.	30-30-29	4,783	sd. sh. drlg.
United Expl. Co., No. 1 Bakersfield, Kern Co.	23-30-27	3,754	suspended
Standard Oil Co., No. 1 Round Mountain, Kern Co.	3-29-29	2,075	sd. sh. drlg.
Jergins Trust, No. 12 Edison, Kern Co.	13-30-29	1,352	sd. sh. drlg.
Jergins Trust, No. 13 Edison, Kern Co.	13-30-29	1,555	Schist
Jergins Trust, No. 14 Edison, Kern Co.	13-30-29	....	bldg. fdn.
Shell Oil Co., No. 9 Edison, Kern Co.	15-30-29	632	sd. sh. drlg.
Shell Oil Co., No. 10 Edison, Kern Co.	14-30-29	....	rig; suspended
Rogers & Osborne, No. 1 Edison, Kern Co.	19-30-30	1,035	sd. sh. drlg.
General Pet., No. 10 Edison, Kern Co.	24-30-29	....	rig; suspended
General Pet., No. 11 Edison, Kern Co.	10-30-29	1,895	cmtd. 1,735
Appling, C. E., No. 1 Edison, Kern Co.	4-30-29	3,690	P.B. 3,625
Bauer, J. H., No. 1 Edison, Kern Co.	21-30-29	4,554	P.B. 2,972
Seeple, J. O., No. 1 Elk Hills, Kern Co.	5-30-24	5,265	suspended
General Pet., No. 1 Arvin, Kern Co.	1-32-29	8,847	Schist; abd.
Hutcheson & Osborne, No. 2 Arvin, Kern Co.	32-30-30	700	cmtd. 665
Arlington Prop., No. 1 Buttonwillow, Kern Co.	6-28-23	3,235	gas; shut in
Milham Exploration Co., No. 5 Buttonwillow, Kern Co.	5-28-23	3,127	gas; shut in
The Texas Co., No. 1 Buttonwillow, Kern Co.	6-28-23	2,435	gas; shut in
The Texas Co., No. 2 Buttonwillow, Kern Co.	8-28-23	2,475	gas; shut in
Superior Oil Co., No. 1 Semi-Tropic, Kern Co.	23-27-23	2,418	gas; shut in
Superior Oil Co., No. 2 Semi-Tropic, Kern Co.	34-27-24	5,452	sd. sh. drlg.
Fullerton Oil Co., No. 1 Semi-Tropic, Kern Co.	1-27-22	2,391	gas; shut in
Fullerton Oil Co., No. 2 Semi-Tropic, Kern Co.	14-27-23	2,463	gas; shut in
Fullerton Oil Co., No. 3 Semi-Tropic, Kern Co.	9-27-23	3,150	gas; shut in
Fullerton Oil Co., No. 4 Semi-Tropic, Kern Co.	26-27-23	2,395	gas; shut in
Fullerton Oil Co., No. 5 Semi-Tropic, Kern Co.	8-27-23	2,347	gas; shut in
Fullerton Oil Co., No. 6 Semi-Tropic, Kern Co.	25-27-23	2,441	gas; shut in
Fullerton Oil Co., No. 7 Semi-Tropic, Kern Co.	25-27-23	2,437	gas; shut in
Fullerton Oil Co., No. 8 Semi-Tropic, Kern Co.	25-27-23	2,439	gas; shut in
Fullerton Oil Co., No. 9 Semi-Tropic, Kern Co.	26-27-23	2,431	gas; shut in
Fullerton Oil Co., No. 10 Semi-Tropic, Kern Co.	15-27-23	2,414	gas; shut in
Fullerton Oil Co., No. 13 Semi-Tropic, Kern Co.	31-27-24	3,453	dry; abd.
Standard Oil Co., No. 1 Semi-Tropic, Kern Co.	8-27-23	3,200	gas; shut in
Standard Oil Co., No. 3 Semi-Tropic, Kern Co.	7-27-23	2,355	gas; shut in
Standard Oil Co., No. 4 Semi-Tropic, Kern Co.	9-27-23	4,578	redrlg. 3,965
Standard Oil Co., No. 6 Semi-Tropic, Kern Co.	8-27-23	2,361	gas; shut in
Standard Oil Co., No. 7 Semi-Tropic, Kern Co.	1-27-22	3,876	dry; abd.
Standard Oil Co., No. 8 Semi-Tropic, Kern Co.	12-27-22	2,426	gas; shut in
Standard Oil Co., No. 9 Semi-Tropic, Kern Co.	1-27-23	....	foundation
Standard Oil Co., No. 11 Semi-Tropic, Kern Co.	20-27-24	4,500	deep test
Standard Oil Co., No. 12 Semi-Tropic, Kern Co.	30-27-24	4,364	Tr. sh. drlg.
Standard Oil Co., No. 13 Semi-Tropic, Kern Co.	6-27-23	2,408	gas; shut in
Standard Oil Co., No. 14 Semi-Tropic, Kern Co.	36-27-23	....	rigging up
Standard Oil Co., No. 15 Semi-Tropic, Kern Co.	16-27-23	3,215	gas; shut in
Standard Oil Co., No. 17 Semi-Tropic, Kern Co.	16-27-23	3,051	gas; shut in
Milham Expl. Co., No. 1 Semi-Tropic, Kern Co.	15-27-23	3,122	gas; shut in
Milham Expl. Co., No. 2 Semi-Tropic, Kern Co.	15-27-23	2,422	gas; shut in
Milham Expl. Co., No. 3 Semi-Tropic, Kern Co.	15-27-23	2,385	gas; shut in
Milham Expl. Co., No. 4 Semi-Tropic, Kern Co.	24-27-23	2,486	gas; shut in
Comanche Oil Co., No. 1 Comanche, Kern Co.	15-32-29	5,250	sd. sh. drlg.
Tejon Ridge Oil Co., No. 1 Comanche, Kern Co.	23-32-29	2,187	suspended
Shell Oil Co., No. 1 Buena Vista, Kern Co.	9-32-25	9,453	P.B. 5,883
Ohio Oil Co., No. 1 Buena Vista, Kern Co.	31-31-26	5,302	gas; shut in
Ohio Oil Co., No. 3 Buena Vista, Kern Co.	31-31-26	5,165	sd. sh. drlg.
Silver Gate Oil & Gas Co., No. 1 Tejon, Kern Co.	7-10-19	2,931	gr. sd. drlg.
Pacific Expl. Co., No. 1 Kreyenhagen, Fresno Co.	17-21-17	1,600	Schist
Union Oil Co., No. 1 Lillis-Welsh, Fresno Co.	24-21-16	10,944	redrlg. 10,275
K.N.D.A., No. 54 Kettleman North, Fresno Co.	24-21-16	8,358	cleaning out
Standard Oil Co., No. 2 Kettleman Middle, Kings Co.	29-23-19	7,885	fishing
Pet. Sec., No. 1 Kettleman Middle, Kings Co.	30-23-19	6,531	br. sh. drlg.
Farrel Pet., Well No. 1, San Luis Obispo Co.	18-31-12	1,924	sd. sh. drlg.
Birch-Royer Oil Co., No. 1 Pismo, San Luis Obispo Co.	33-31-13	395	sd. sh. drlg.
United Oil Co., Well No. 1, San Luis Obispo Co.	2-32-21	....	bldg. rig
Willett Oil Co., No. 1 Cholame, San Luis Obispo Co.	10-25-15	3,687	recmtd.
Milham Expl. Co., No. 1 Tulare Lake, Kings Co.	5-22-19	1,800	will cmt.
Commonwealth Consd. Gas, No. 1 Tulare Lake, Kings	21-22-20	2,490	gas; shut in
Commonwealth Consd. Gas, No. 2 Tulare Lake, Kings	21-22-20	1,400	sd. sh. drlg.
Dudley Ridge Dev. Co., No. 1 Dudley Ridge, Kings Co.	24-23-20	1,300	suspended
Amerada Pet., No. 1 F.L.D., San Joaquin Co.	15- 2-5	8,852	hd. sh. drlg.
Amerada Pet., No. 2 F.L.D., San Joaquin Co.	15- 2-5	4,063	producing gas
Amerada Pet., No. 3 F.L.D., San Joaquin Co.	22- 2-5	4,060	gas; shut in
Amerada Pet., No. 4 F.L.D., San Joaquin Co.	23- 2-5	....	bldg. rig
Pure Oil Co., No. 1 Chowchilla, Madera Co.	7-10-4	8,402	gas; shut in
Pure Oil Co., No. 2 Chowchilla, Madera Co.	8-10-14	2,700	shows gas
Northern Counties Pet., No. 1 Tehama, Tehama Co.	25-24-3	5,031	recmtd. 4,904
Shell Oil Co., No. 1 Branch, Monterey Co.	34-24-10	5,986	sd. sh. drlg.
Clark, George, No. 1 Ducor, Tulare Co.	31-23-28	1,210	Schist
Seahawk Oil Co., No. 1 White River, Tulare Co.	24-24-28	....	material
Buttes Oilfields, Well No. 3, Sutter Co.	11-15-1	5,213	recmtd. 4,944

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Larco Oil Co., No. 1 El Segundo, Los Angeles Co.	12- 3-15	7,600	redrlg. 7,448
Sovereign Oil Co., No. 1 El Segundo, Los Angeles Co.	22- 3-14	6,551	sd. sh. drlg.
Pioneer Holding Co., No. 1 El Segundo, Los Angeles	33- 3-14	4,200	sd. sh. drlg.
Clark, T. R., No. 1 El Segundo, Los Angeles Co.	6- 4-14	....	rig; suspended
Shell Oil Co., No. 1 Long Beach, Los Angeles Co.	13- 4-13	....	rigging up
Standard Oil Co., No. 10 Inglewood Deep, Los Angeles	8- 2-14	3,681	O.S. drlg.
Standard Oil Co., No. 11 Inglewood Deep, Los Angeles	8- 2-14	3,122	completing
Blackline Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,634	redrlg. 6,468
Crest Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,703	P.B. 6,673
Mathews Pet. Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,543	suspended
Birch-Royer Oil Co., No. 1 Del Rey, Los Angeles Co.	34- 2-15	6,537	cleaning out
Joyce Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	6,742	P.B. 6,675
Anglo American Oil Co., No. 1 Del Rey, Los Angeles	27- 2-15	6,905	hd. sh. drlg.
Union Oil Co., No. 18 Del Rey, Los Angeles Co.	27- 2-15	....	bldg. rig
Treasure Oil Co., No. 1 Del Rey, Los Angeles Co.	27- 2-15	5,157	redrlg. 4,952
Yant Pet. Corp., No. 1 Newhall, Los Angeles Co.	1- 3-16	121	sd. sh. drlg.
Dabney Pet. Co., No. 1 Malibu, Los Angeles Co.	5- 2-18	65	tech. spud
Vanco Dev. Co., No. 1 Artesia, Los Angeles Co.	25- 3-12	5,817	suspended
Eyer Pet. Co., No. 1 Torrance, Los Angeles Co.	20- 4-13	1,410	sd. sh. drlg.
Monarch Oil Corp., No. 1 Topanga, Los Angeles Co.	5- 1-16	652	cmtd. 624
Standard Oil Co., No. 78 Montebello, Los Angeles Co.	2- 2-12	3,835	flow. 658 b.d.
Signal Oil Co., No. 1 Montebello, Los Angeles Co.	4- 2-11	2,900	sd. sh. drlg.
Woodward Oil Co., No. 2 Montebello, Los Angeles Co.	4- 2-11	....	rigging up
The Texas Co., No. 1 Montebello, Los Angeles Co.	5- 2-11	7,275	fish. D.P.
The Texas Co., No. 2 Montebello, Los Angeles Co.	5- 2-11	5,781	cmtd. 5,363
Universal Consd., No. 2 Montebello, Los Angeles Co.	5- 2-11	6,627	cmtd. 6,530
Universal Consd., No. 4 Montebello, Los Angeles Co.	5- 2-11	5,607	flow. 1,606 b.d.
St. Helens Pet. Co., No. 2 Montebello, Los Angeles Co.	5- 2-11	....	location
Wilshire Oil Co., No. 1 Montebello, Los Angeles Co.	5- 2-11	5,971	set whipstock
Wilshire Oil Co., No. 2 Montebello, Los Angeles Co.	4- 2-11	3,954	hd. sd. drlg.
Wilshire Oil Co., No. 3 Montebello, Los Angeles Co.	11- 2-11	3,276	sd. sh. drlg.
North American, No. 1 Montebello, Los Angeles Co.	30- 1-10	4,270	sd. sh. drlg.
Hillman & Long, No. 1 Montebello, Los Angeles Co.	28- 1-11	3,650	sd. sh. drlg.
Frontier Oil Co., No. 1 Pico, Los Angeles Co.	7- 2-11	5,246	suspended
Oil & Gas Associates, No. 1 Pico, Los Angeles Co.	9- 2-11	2,896	hd. sh. drlg.
Pressel & Tull, No. 1 Puente, Los Angeles Co.	30- 2-9	4,535	suspended
Fraser, N. M., No. 1 Saugus, Los Angeles Co.	31- 4-16	853	fishing
International Oil Dev., No. 1 Saugus, Los Angeles Co.	34- 5-16	1,276	sd. sh. drlg.
Great Coastal Oil Co., No. 1 Elsinore, Riverside Co.	36- 5-5	1,550	sd. sh. drlg.
Domain Dev. Co., No. 1 Trabuco, Orange Co.	3- 6-7	1,086	suspended
Continental Oil Co., No. 1 Santa Ana, Orange Co.	14- 5-10	4,395	hd. sd. drlg.
Leaseholders Dev. Co., No. 1 Atwood, Orange Co.	26- 3-9	4,040	suspended
Cook, T. A., No. 1 Richfield, Orange Co.	36- 3-9	....	rebldg. rig
Standard Oil Co., No. 1 Richfield, Orange Co.	36- 3-9	2,432	sd. sh. drlg.
Viking Oil Co., No. 1 Richfield, Orange Co.	29- 3-9	4,782	pump. 25 b.d.
Hillman & Long, No. 1 San Juan, San Bernardino Co.	2- 3-8	2,418	suspended
Tehama Pet. Co., No. 1 Chino, San Bernardino Co.	33- 2-8	3,068	fishing

S. W. TEXAS WILDCATS

Week Ending November 9

Atascosa County

R. C. Lee's No. 1 Atascosa Trust, 160 ft. S line, 300 ft. E line, 152-ac. lease, J. T. Russell Sur. No. 1,222.
Spudded in; drlg. water well; W.O. csg.

Robert McIntyre's No. 1 Billimek, 1,104 ft. SW line, 3,700 ft. SE line, J. D. Woodruff Sur. No. 246.
M.I. rig.

Bandera County

Plateau Oil Co.'s No. 1 Garrison, G.C.&S. F. Sur. No. 506, 1,500 ft. from W and 2,970 ft. from N lines of survey.
Drlg. soft shale 4,932 ft.

Bastrop County

Marts & Beaven's No. 1 Kirksey, 150 ft. NW and SW lines, 75-ac. tract, Geo. Glasscock Sur.
Drlg. 1,265 ft.

Port Isabel Oil & Gas Co.'s No. 1 G. A. Smith, J. B. Blalock Sur., 600 ft. SE, NE cor. J. Doyle Sur.
Drlg. 1,320 ft.

Bee County

Geo. W. Church's No. 1 Hearn, 2,000 ft. S No. 1 Wood.
Rigging up.

D. C. Smith's No. 1 Robertson, 150 ft. N and W lines, T. B. Barton Sur., Abst. 114.
Rigging up.

Bexar County

Jas. B. Cunningham's No. 1 L. F. Ridder, 950 ft. S of Nelson Road, 1,300 ft. from E line, Block 5,196, Sur. No. 58.
T.D. 860 ft.; standing.

Dorine Oil Co.'s No. 1 Haywood, 1,000 ft. E No. 2 Tudyk, Cardenas Sur.
M.I.M.

Dorine Oil Co.'s No. 2 Tudyk, 400 ft. E line, 260 ft. S line, 315-ac. tract, Cordenas Sur.
T.D. 760 ft.; going on pump.

Joe Dupree's No. 2 Coffey, 995 ft. SW line, 910 ft. SE line lease, Rodriquez Sur.
Drlg. 783 ft.

Morgan & Magna's No. 1 Kirkwood, Desaque Sur., 9 miles SW of San Antonio.
Location.

Bert Mowinkle's No. 1 Kotsur, 434 ft. N line, 150 ft. W line, Loringville Sur.
Rigged up.

Fred Thorman's No. 1 Sahn, 330 ft. E line, 600 ft. S line of tract, Sur. No. 3.
Spudded in; waiting on rotary rig.

Brooks County

Winfield and Mosser's No. 1 Singer, 660 ft. N and E lines, SE¼ Sec. 312.
Drlg. 1,053 ft.

Caldwell County

P. M. Armstrong's No. 1 Dunlap, 300 ft. W Bob Rose No. 1 Pierce, Dunlap area.
Bldg. derrick.

Clark & Crouch's No. 1 Jolly, 310 ft. SW line, Crenshaw Sur., 4,950 ft. NW line, House Sur.
Cored Edward sand 1,337 ft.; set csg. 972 ft.; testing chalk.

J. J. Elam's No. 1 Brown, 450 ft. SE and SW lines of lease, Souvereign Sur.
Rigging up.

Port Isabel Oil & Gas Co.'s No. 1 Baker, 990 ft. SE line, 330 ft. SW line, 167-ac. tract, Geo. W. James Sur.
Spudded in.

W. H. Jennings' No. 1 McMahan, 250 ft. SE and SW lines, 68-ac. tr.
Location.

Cameron County

Joseph Anderson's No. 1 Browne, 330 ft. N line, Blk. 379, San Benito Subd., Espirito Santo grant, 3 miles N Rio Hondo.
Standing 5,195 ft.

Kingwood & Daniels' No. 1 Port Isabel, Share 29.
Spudded in; S.D.

Dewitt County

Reginald F. Baurke's No. 1 W. C. Steinman Est., 937 ft. from N and S lines Uriah Blue 1-3 League.
S.D. 2,412 ft.

D. G. Glaspier's No. 1 Schuebel, 330 ft. from S and W lines of tract, Fitzgerald grant.
Set surface csg.; moving in larger rig.

Dimmitt County

Diamond Half Oil Co.'s No. 1 Eardley Est., 2,390 ft. SW line, 330 ft. NW line, E. A. McCorquodale Sur. No. 6.
T.D. 4,250 ft.; plugged and abnd.

Duval County

J. H. Chandler's No. 2 Rita Pena, Share 4, Mesquite grant.
Skidded over from No. 1.

Magnolia Pet. Co.'s No. 1 D.C.R.C.-Sentz, 330 ft. S and E lines, Sur. 155.
Drlg. 3,390 ft.

A. E. Masterson's No. 1 Rogers, 2,310 ft. NE line, 1,650 ft. SE line, 40-ac. tract, H.&G.N. R.R. Co. Sur. 15.
Drlg. water well

Plymouth Oil Co.'s No. 1 Cuellar, 330 ft. NW and NE lines, Sur. 123.
S.D.; T.D. 3,128 ft.

Santa Clara Oil Co.'s No. 1-B James F. Welder Heirs, 330 ft. SW cor. 640-ac. tr. lying W of Sec. 525, in Sec. 103.
Location.

T. G. & M. Drlg. Co.'s No. 2 M. Davidson, Sur. 90.
Location.

Texia Oil Corp.'s No. 1 N.L.&L. Co., 330 ft. from S and W lines, NE¼, Sur. 101, B.S.&F. Sur.
T.D. 2,753 ft.; D.&A.

Trinity Drillers, Inc.'s No. 1 Sweden ranch (Driscoll-Sevier), 330 ft. N and E lines, Sec. 68, Santa Rosalie grant.
Moving in material.

Edwards County

Paul Teas' No. 1 Stewart, C SE¼, Sec. 1, G.C.&S.F. Sur.
Location.

Frio County

W. D. Bacon's No. 1 Burns, 2,500 ft. S and W line, Thomas Clifton Sur.
Drlg. 2,230 ft.

Goliad County

Hendricks et al's No. 1 Gillette, 330 ft. of NW and SW lines of tract, G. Gomez Sur.
Location.

Keystone Royalty Co.'s No. 2 M. Woods, 330 ft. S and E lines, SE¼ 160-ac. tract, Sec. 13, Josefa Rios Sur.
Top gas sand 5,975 ft.; T.D. 5,983 ft.; waiting on string; csg. set 5,983 ft.; T.D. 6,011 ft.; prep. to deepen.

Thompson Drlg. Co.'s No. 1 Hays Taylor estate, 900 ft. SE line, 2,400 ft. W cor. 791-ac. tract, Smith Sur.
M.I.M.

Gonzales County

Interallied Pet. Co.'s No. 1 Wells, 1,708 ft. S line, 185 ft. W line, Sec. 3, 648-ac. subvd., Wells Ranch.
Bane Sur.
S.D. for orders 4,075 ft.

Guadalupe County

Hopkins Bros.' No. 1 Sherrill, 150 ft. NW line, 625 ft. NE line, 300 ft. SW No. 1 Gabriel.
T.D. 850 ft.

Hidalgo County

Gulf States Oil Co.'s No. 2 J. C. Engleman, 400 ft. S and E lines, Lot 3, Blk. 70, Las Mestanas grant.
Drlg. 1,910 ft.

Gulf States Oil Co.'s No. 1 Delta Orchards, 530 ft. from N line, 400 ft. W line, Lot 2, Blk. 73, Las Westanas Grant.
Rigging up.

Kingwood Oil Co.'s No. 2 Osca Daskom, 723 ft. N line, 1,805 ft. E line, Blk. 30, Porc. 45, J. of Reynosa.
Moving in material.

Lensgraf-Walden-Carmen's No. 1 Brock & Showers, 330 ft. W line, 615 ft. S line, Lot 4, Blk. 12, Por. 80.
Drlg. 3,050 ft.

Maxwell's No. 1 Hidalgo Water Dist. No. 2, Lot 11, Blk. 20, Alamo Land & Sugar Co. Subd., Alamo tract, 10 miles SW McAllen.
Rigging up.

Sloan et al's No. 1 Brock & Showers, 350 ft. S and W lines, Lot 9, Blk. 16, Por. 87.
T.D. 6,003 ft.; perforations 4,666-69 ft. and 4,774-77 ft.; tested salt water; recemented; S.D. for orders.

Dayle L. Smith Oil Co.'s No. 1 Fairbanks & Young, Blk. 44, Por. 46, Jurisdiction of Reynosa.
Rigging up.

Jim Hogg County

S. L. Miller Oil Co.'s No. 1 Yeager, 150 ft. E line, 477 ft. S line, Blk. 6, Sur. 20.
Drlg. 2,620 ft.

Jim Wells County

Putnam & Stewart's No. 1 Hawkins, 1,200 varas N, SW cor. lease, at R.R. and lease point, thence 1,200 varas W.
S.D. for larger rig; T.D. 2,400 ft.

Smith & Storey's No. 1 McGill, 660 ft. S No. 1 Dilworth.
Coring 2,310 ft.

J. E. Walsh's No. 1 Wade, 750 ft. NW line, 300 ft. NE line, Lot 3, Blk. C.
Resumed drlg. 1,700 ft.

Kendall County

H. W. Martin's No. 2 Edwin Houston, I.T.&N. Sur. 598.
Location.

Southwestern Dev. Co.'s No. 1 Werner 765 ft. W line, 1,645 ft. N line, J. F. Torrey Sur. No. 781
T.D. 972 ft., underreaming.

Kerr County

Auld and Evans' No. 1 Heffner, 660 ft. N line, 330 ft. E line, Sec. 13, B.S.&F. Sur.
Rigged up; S.D.

Eastland Oil Co.'s No. 5-E Love, 1,586 ft. E line, 300 ft. N line, Sur. 1,591.
T.D. 5,625 ft.; S.D.

Kleberg County

John Bartlett's No. 1 Anton Deitz, SE¼ SE¼ Sec. 48, K.T.&I. Subd.
Drlg. 700 ft.

Fidelity Oil Co.'s No. 1 Flato, 150 ft. S and E lines, Blk. 14, Sec. 40, K.T.&I. Sur.
Location.

Fidelity Exp. Co.'s No. 1 Sam Michalk et al, 330 ft. from N line and 775 ft. from S line, Blk. 37, Sec. 5; 5 miles SE Kingsville.
S.D. approx. 2,900 ft.

LaSalle County

Bier & Witherspoon's No. 1 LaSalle Co., 1,320 ft. S and W lines, Sec. 19, Bland & Nelson Subd., O'Connor ranch.
Spudded in; S.D.

Roy Shipman's No. 1 Coleman, 330 ft. SW cor. Blk. 15, Sur. 514.
Drlg. 825 ft.

Lee County

J. Spivey's No. 1 First National Bank, 300 ft. S and E lines, 846-ac. tract, Mack Sur.
Location.

Live Oak County

G. C. Beauchamp's No. 1 S. A. Joint Stock Land Bank, 150 ft. N and E lines, Turner Sur.
Location.

E. H. Buchner's No. 1 McNeill, 300 ft. of SW cor. of 40-ac. tract, Blk. 8, McNeill Subd.
Location.

California Co.'s No. 1 Gillett Community Lands, 2,540 ft. NW line, 450 ft. S line lease, Refugio County School Lands, Sur. No. 7.
Location.

Earl Calloway's No. 1 Lyne, 895 ft. of W line, 330 ft. of N line, SW¼ SW¼ of M. M. Lyne Sur.
Coring 3,655 ft.

H. H. Coffield's No. 1 Cowie, 250 ft. S and W lines, 130-ac. tr., Allen Sur.
Drlg. water well.

Conway & Beuscher's No. 1 Sanger, 50 ft. W line, 150 ft. SW line, 640-ac. lease, Sur. 224.
T.D. 3,255 ft.; D.&A.

Ogden & Reed's No. 1 Reed, 330 ft. SW and NW lines, I.&G.N. R.R. Sur. No. 5, Derrick.

Santa Clara Oil Co.'s No. 1 Corbett, Sec. 2, R. H. Corbett Sur.
M.I.M.

Trinity Drillers, Inc.-Groups' Nos. 1 and 2 Oil Corp.'s No. 1 McNeill, 60-ac. tract, Tract 1, Blk. 10, Jane Curry Sur.
Drlg. 2,780 ft.

Wheelock & Collins' No. 1 Kirby, 1,650 ft. S line, 5,795 ft. E line, 817-ac. tract, Thos. B. Reese Sur.
Ready to spud in.

McMullen County

Aransas Oil Co.'s No. 1 Reed, 330 ft. E line, 1,320 ft. S line, Spicer Sur.
T.D. 1,680 ft.; S.D.

Bussa Oil Co.'s No. 1 J. H. Dickinson, 330 ft. E line, 4,340 ft. N line, G. B. Dilworth Sur. No. 24.
Drlg. 500 ft.

C. O. Garney's No. 1 Hagist, 330 ft. N and W lines, SE¼, Sur. 6.
Location.

Marzo Oil Co.'s No. 1-B Hagist, 330 ft., S and E lines, Sec. 6.
Drlg. 1,442 ft.

Reliance Oil & Royalty Co.'s No. 1 Shiner, 330 ft. NE cor. Sec. 29, C. C. Shumway Subvd.
Spudded in.

Stewart et al's No. 1 G. Lowe, 2,000 ft. W line, 2,400 ft. S line, Geo. Bright Sur. No. 21.
Drlg. 260 ft.

West & Stevenson's No. 1 Fisher, 330 ft. N and W lines, O'Boyle Sur.
Set csg. 503 ft.; completing.

Medina County

F. Brown's No. 1 Brucks, 900 ft. W line, 660 ft. S line, Brucks tract, John Ward Sur. No. 18.
Drlg. 515 ft.

Frank Brown's No. 2 Winn, 600 ft. W line, 300 ft. N line, Ward Sur.
Spudded in; S.D.

Caroca Oil Co.'s No. 2 Roy Taylor, 600 ft. N line, 150 ft. E line, NE¼ W½ Sur. 135.
Drlg. 390 ft.

Joe Dupree's No. 1 Brucks, 404 ft. N line, 165 ft. E line, Castro Sur. No. 248.
No report.

Ed Falvey's No. 1 McMenemy, 160 ft. S and W lines, Sur. 33.
Drlg. 160 ft.

Gates & Hills' No. 3 Odem, 340 ft. W line, 1,975 ft. S line, Castro Sur. 174.
Lost bailer 465 ft.; abnd.

Letro Oil Corp.'s No. 1 E. B. Forrest 1,928 ft. from N line, 1,908 ft. from E line of 640-ac. tract, Blk. 69.
Drlg. 610 ft.

Nueces County

Bluff Pet. Co.'s No. 1 Bluntzer, 330 ft. SW and SE lines, NE 1,007-ac. tract, Sec. 6, Casa Blanco grant.
Drlg. 3,020 ft.

La Jita Corp.'s No. 1 King, C SE¼ SW¼ Sec. 22.
P.B. 3,980-87 ft.; comp.; no gauge.

S. Nelson's No. 1 Buckholt, 990 ft. E line, 150 ft. S line, S 114.8-ac. tract, Blk. 4, Sec. 316.
Drlg. 260 ft.

Santa Clara Oil Co.'s No. 1 Driscoll-Sevier, 4,456.2 ft. N line, 990 ft. E line, Wm. Gamble Sur.
Drlg. 3,508 ft.

H. A. Meyer's No. 1 Harney, 850 ft. W line, 225 ft. S line, 3,200-ac. tract.
Location.

San Patricio County

Benedum & Trees' No. 1 Welder, 2,640 ft. N line, 660 ft. W line, Sec. 34.
Drlg. shale 5,947 ft.

George E. Smith's No. 1 Britton, 330 ft. N and W lines, Lot 8, Sec. 6.
M.I.M.

Starr County

Ash & Tackett's No. 1 Margo, 150 ft. S and E lines, Blk. 4, Share 3-B, Por. 70.
Set csg. 345 ft.; to test shallow sand.

J. H. Clopton's No. 2 Bass, 2,460 ft. E line, Por. 87, 17,409 ft. W of Highway No. 4, Por. 87.
Drlg. 131 ft.

Cook-Maris Arnold's No. 1 S.C.C.C., 220 ft. N line, 25 ft. E line, Lot 24, Por. 89.
Drlg. 905 ft.

Evans & James' No. 1 Ferry, 150 ft. S and SE lines lease, Por. 72.
Drlg. 1,555 ft.

McCurry & Yates' No. 1 S.C.C.C., 150 ft W line, 510 ft. N line, Blk. 58, Porc. 89
Location.

McCurry & Yates' No. 2 S.C.C.C., 150 ft. E line, 510 ft. N line, Blk. 58, Porc. 89.
Location.

Pedernal Oil Co.'s No. 1 Hicks et al, 187 ft. from NW line, 318 ft. from NE line of Blk. 6, Pedernal Grant.
T.D. 2,210 ft.; S.D.

Hiram M. Reed's No. 1 S.C.C.C., 888 ft. W line, 150 ft. N line, Blk. 66, Jefferies-Lambeth Subd., Porc. 89.
M.I.M.

Webb County

Austin & Vernon's No. 1 Jeffries, 150 ft. NE line, 1,170 ft. SE line, Blk. 13, Sur. 1,453.
Set surface csg.; S.D.; T.D. 40 ft.

E. T. Burton's No. 1 Billings, NE cor. of SW¼, Sur. 113.
Location.

Clopton & Doffing's No. 1 Slator, center Blk. 29, Borrego grant.
Drlg. 2,233 ft.

O. W. Killam's No. 1 Ortiz, 200 ft. SE line, 3,350 ft. S.W. road, Porc. 17.
Resumed drlg. 240 ft.

Magnolia Pet. Co.'s No. 1 Garcia-Arriba, 330 ft. S and E lines, Blk. 8, Albercas grant.
No report.

J. E. Neal's No. 1 Laurel Bros., 1,320 ft. of S and E lines, Sur. 1,119.
Rigged up; standing.

Magnolia Pet. Co.'s No. 1 Volpe Bros., 330 ft. N and W lines, Sur. 35b.
Drlg. 4,110 ft.

Arthur H. Wray's No. 1 Geo. Stuempfle, Share 1, Brewster pasture, Galan grant.
Drlg. 2,140 ft.

S. S. & B. Oil Co.'s No. 6 Lone Star Co., 7,700 ft. NE line, 330 ft. SE line, Por. 12.
Standing 180 ft.

Willacy County

Kingwood Oil Co.'s No. 1 Santa Rosa, Inc., 160 ft. from E line, 637 ft. from S line of Sec. 30, Blk. 16, Share 44, San Juan de Carricitas grant.
Swabbed S.W. 6,200-6,519 ft.; plugged; to perforate 6,025-53 ft.

L. & S. Drlg. Co.'s No. 2 Armendiaz, near Rio Hondo, 7,795 ft. from E and W lines of Share 14.
Drill stem parted at 2,200 ft. while fishing; abnd.; T.D. 5,240 ft.

Zapata County

Murt Cullinan's No. 1 Gutierrez, Blk. 4, Share 2, Fansler Partition, Comitas Grant.
Rigging up.

J. J. O'Hern's No. 1 Raymond, 330 ft. NW line, 330 ft. NE line, Blk. 5, Share E, Por. 27.
Drlg. 1,610 ft.

S. W. TEXAS PROVEN

Week Ending November 9

Caesar—Bee County

Caesar Oil Co.'s No. 6 R. E. Miller, N offset to Commodor's No. 4 Grissom.
Location.

C. Echols' No. 1 Hudman, 150 ft. N and W lines, 10-ac. tract.
D.S. test 460 ft. oil, 15 lbs. W.P., 15 min.; set csg. 3,088 ft.; W.O.C.

Sun Oil Co.'s No. 1 Barroum, 990 ft. N line, 330 ft. E line lease.
Location.

Dirks—Bee County

Home Oil Co.'s (Wrightsman) No. 7 Bassinger, 330 ft. S and W lines, NW¼, NW¼, sec. 7.
Skidding derrick.

Illinois Pet. Co.'s No. 2 Rapp, 330 ft. N line, 66-ac. tract, 660 ft. W No. 1 Rapp, C. A. Dugat Sur.
Location.

Illinois Pet. Co.'s No. 3 Rapp, 330 ft. N line 66-ac. tract, 660 ft. W No. 2 Rapp, C. A. Dugat Sur.
Location.

Mills Bennett's No. 3-A Rapp, 610 ft. E No. 4, 375 ft. NE No. 3, Dugat Sur.
Comp.; 30 b ls. per hr. on ¼-inch choke; sd. 3,857-71 ft.; T.P. 510 lbs.; C.P. 650 lbs.

Sun Oil Co.'s No. 4 Page, 660 ft. NE No. 2 Page, 330 ft. SE line lease, Young Sur.
Location.

Texas Co.'s No. 11 Young, 660 ft. E No. 10, T. J. Butler Sur.
Sd. 3,880-90 ft. and 3,900-11 ft.; completing.

Wrightsman's No. 2 Bassinger, 330 ft. NE and NW lines, NW¼ Sec. 7.
Sd. 3,796-3,840 ft.; comp. 21 bbls. per hr. on ¼-inch choke.

Ray—Bee County

Simms Oil Co.'s No. 1-B Campbell, 150 ft. S and E lines, Lot 19, Bucher Subd., W. B. Blanchard Sur.
Moving in material.

Sun Oil Co.'s No. 3 Ray, 640 ft. W No. 2 Ray.
Rigged up.

R. J. Worthington's No. 1 Chestnut, 330 ft. NW cor. 40-ac. tract, B. O. Hadley Sur.
Spudded in; S.D.

Rutledge—Bee County

Worth Oil Co.'s No. 4 Rutledge, 660 ft. S No. 2 Rutledge, Hadley Sur.
Location.

Tulsita—Bee County

H. Y. Oil Co.'s No. 2 Ray, 810 ft. N line, 150 ft. W line, Blanchard Sur.
Rigging up.

Highland Oil Co.'s No. 4 Campbell, 40-ac. tract, B.&B. Sur.
Spudded in.

Palo Blanco—Brooks County

United Prod. Co.'s No. 1 Kathleen Jones Hocker, 1,300 ft. SW of No. 2, 1,636 ft. from N line of Los Mogueijes de Palo Blanco grant.
T.D. 5,351 ft.; plugged and abnd.

Government Wells Pool—Duval County

Government Wells Oil Corp.'s No. 16 Lundell, Sur. 48.
Spudded in.

Magnolia Pet. Co.'s No. 9 Johnson, center ¼, E½, Sur. 44.
Location.

Sun Oil Co.'s No. 1 Sutherland, 990 ft. S and W lines, Sec. 122.
Location abnd.

Kohler—Duval County

California Co.'s No. 1 Kohler, 330 ft. N line, 2,597 ft. W line tract.
T.D. 3,141 ft.; fishing.

Labbe—Duval County

Magnolia Pet. Co.'s No. 2 Labbee, 1,650 ft. W line, 990 ft. S line, Sur. 2.
Sand 2,480-85 ft.; comp.; gasser; 25,000,000 ft. per day.

Stanolind O. & G. Co.'s No. 2 Farmers Life, 330 ft. N line, 3,327 ft. E line, E. R. Gray Sur., Sec. 416.
Coring 2,435 ft.

Loma Novia—Duval County

Bridwell Oil Co.'s No. 2 B.C.C., 330 ft. S and E lines, NE¼, SW¼, Sur. 76.
Location.

Bridwell Oil Co.'s No. 2 B.C.C., 990 ft. S line, 2,310 ft. E line, Sec. 76.
Sd. 2,655-65 ft.; comp. on pump; 100 bbls. per day.

Buchanan & Blanco Oil Co.'s No. 1-B Ruiz, 185 ft. N line, 1,650 ft. E line, Sur. 73.
Location.

Rodney DeLange's No. 4 C. W. Hahl, Sur. 78.
Location.

Rodney DeLange's No. 2 DuVon, Sur. 78.
Location.

Rodney DeLange's No. 3 Hahl, Blk. 5, Sur. 78.
T.D. 2,672 ft.; comp.; no gauge.

Eastern States' No. 2 Hubbard, NW cor. SW¼ Sur. 71.
Sand 2,641-47 ft.; comp.

Frank Gravis, No. 2 Byland, 330 ft. S and E lines, Blk. 4, Sur. 78.
Location.

Frank Gravis' No. 1 Eckdahl, 199 ft. E line, 400 ft. S line, Blk. 7, Sur. 78.
Location.

Gilcrease Oil Co.'s No. 1 Byland, 330 ft. N and W lines, Blk. 3, Sur. 78.
Drlg. 2,555 ft.

Hamill, Smith & Ogden's No. 4 Hubbard, 330 ft. NW cor. NW¼ SW¼ Sur. 77.
Location.

Hamill, Smith & Ogden's No. 21 Hubbard, 330 ft. SW cor., SE¼, NW¼, Sur. 77.
Location.

Hamill, Smith & Ogden's No. 27 Hubbard, 330 ft. NE cor., SE¼, NW¼, Sur. 77.
Location.

Hamill, Smith & Ogden's No. 3 Hahl, 330 ft. N line, 200 ft. E line, 18.3-ac. tract; Sur. 78.
Location.

Hamill, Smith & Ogden's No. 4 Hahl, 330 ft. N and W lines, 18.3-ac. tract, Sur. 78.
Location.

Hamill, Smith & Ogden's No. 13 Hubbard, 330 ft. N and E lines, NE¼, SE¼, Sec. 77.
Derrick.

Hamill, Smith & Ogden's No. 14 Hubbard, 330 ft. S and E lines, NE¼, SE¼, Sec. 77.
Location.

Hamill, Smith & Ogden's No. 22 Hubbard, 330 ft. NW cor. SE¼ NW¼ Sur. 77.
Comp. 740 bbls. per day on ¼-inch choke; C.P. 390 lbs.; T.P. 275 lbs.; T.D. 2,672 ft.

Hamill, Smith & Ogden's No. 23 Hubbard, 330 ft. SW cor., NE¼, NW¼, Sur. 77.
T.D. 2,657 ft.; W.O.C.

Hamill, Smith & Ogden's No. 26 Hubbard, 330 ft. SE cor. NE¼ NW¼ Sur. 77.
Comp.; 330 bbls. per day on ¼-inch choke; C.P. 290 lbs.; T.P. 200 lbs.; sd. 2,671-88 ft.

Hamill, Smith & Ogden's No. 32 Hubbard, 330 ft. SE cor. SE¼ SW¼ Sur. 77.
Location.

Highland Oil Co.'s No. 4 Hubbard, SE¼, Sur. 75.
Location.

Humble O. & R. Co.'s No. 3 M. C. Hubbard, 990 ft. S line, 330 ft. W line, 320-ac. lease, sec. 84.
Drlg. 310 ft.

Humble O. & R. Co.'s No. 4-C Welder, 660 ft. S line, 1,320 ft. W line, Sur. 554.
Sd. 2,701-95; swabbing.

Lipscomb & Daubert's No. 2 Hubbard, 330 ft. S and E lines, S½ NE¼ Sur. 75.
Set csg. 2,636 ft.; no report.

Lipscomb and Daubert's No. 3 Hubbard, 330 ft. S and E lines, S½, NE¼, Sur. 75.
Location changed.

Magnolia Pet. Co.'s No. 10 Hahl, 640-ac. tr., Sur. 67.
Location.

Magnolia Pet. Co.'s No. 11 Hahl, 640-ac. tr., Sur. 67.
Location.

Magnolia Pet. Co.'s No. 2-C Magnolia-Hahl, Blk. 9, Sur. 78.
Location.

Magnolia Pet. Co.'s No. 1-C Magnolia-Hahl, Blk. 9, Sur. 78.
T.D. 2,555 ft.; W.O. pumping.

Reynosa Oil Co.'s No. 1-B Mary Davison, 1,650 ft. E line, 330 ft. S line, Sur. 114.
Derrick.

Reynosa Oil Co.'s No. 2-B Davison, 330 ft. S line, 990 ft. E line, Sur. 114.
Sd. 2,571-72 ft.; comp. 35 bbls. per hr.; T.D. 2,596 ft.

Russ Pet. Co.'s No. 5-D Hahl, Sur. 64.
Set csg. 2,540 ft.; W.O.C.

Russ Pet. Co.'s No. 1 Duke, 330 ft. N and W lines, 40-ac. tract, Sec. 64, J. Poitevent Sur.
Location.

Shell Pet. Corp.'s No. 12 Hubbard, 2,303 ft. E line, 1,086 ft. N line, 320-ac. tr., Sur. 77.
Derrick.

Shell Pet. Corp.'s No. 9 Hubbard, 990 ft. S line, 2,263 ft. E line, 320-ac. tract, Sur. 77.
Comp. 51 bbls. per hr.; C.P. 640 lbs.; T.D. 2,729 ft.; T.P. 60 lbs.

Shell Pet. Corp.'s No. 10 Hubbard, 993 ft. S line, 330 ft. E line, 320-ac. tract, Sur. 77.
Coring sh. 2,727 ft.

Shell Pet. Corp.'s No. 11 Hubbard, 330 ft. N and W lines, 320-ac. tract, Sur. 77.
Set csg. 2,685 ft.; W.O.C.

Texas Co.'s No. 11 Wendt, 450-ac. tr., Sur. 68.
Location.

Texas Co.'s No. 8 Hahl, Blk. 8, Sur. 78.
Rigging up.

Texas Co.'s No. 10 Vela, 2,970 ft. E line, 300 ft. S line, Sur. 42.
Drlg. 300 ft.

Texas Co.'s No. 2-B Ruiz, 330 ft. S and W lines, Sur. 41.
T.D. 2,578 ft.; S.D.

Texas Co.'s No. 7 Hahl, 330 ft. S and W lines, Blk. 8, Sur. 78.
Comp.; no gauge; T.D. 2,610 ft.

Piedras Lumbre—Duval County

Texas Co. and Ohio Fuel Co.'s No. 1 D.C.R.C., 330 ft. N and W lines, Sec. 96.
Plugged and abnd.

Piedras Pintas—Duval County

P. K. Kelly's No. 1 Tinney, 200 ft. E line, 1,100 ft. N line, Sur. 8.
Sand 800-05 ft.; standing.

Sarnosa—Duval County

Seaport Oil Co.'s No. 16-A D.C.R.C., Sur. 574.
Sand 2,377-2,410 ft.; comp. on pump 35 bbls. per hr.; T.D. 2,411 ft.

Seven Sisters—Duval County

Atlantic Oil Prod. Co.'s No. 2 B. Welder, W½ SE¼, Sur. 385.
Location.

Atlantic Oil Prod. Co.'s No. 1-B Welder, 330 ft. N and W lines, W½ SE¼ Sur. 385.
Comp. 550 bbls. per day on ¼-inch choke; C.P. 310 lbs.; T.P. 130 lbs.; sd. 2,482-97 ft.

Buchanan-Blanco Oil Co.'s No. 3 Wood-Welder, 990 ft. N ine, 330 ft. E line, 82.1-ac. tr., sec. 385.
Spudding in.

Buchanan-Blanco Oil Co.'s No. 2 Wood-Welder, 957 ft. E line, 330 ft. N line, 82.1-ac. tract, Sec. 385.
Comp.; 24 bbls. per hr.; sd. 2,450-76 ft.

Daube & Westheimer's No. 1-Z Campos, 330 ft. S and W lines, Sur. 224.
Drlg. 660 ft.

Dulce Oil Co.'s No. 4 Serna, 660 ft. E No. 3, Sur. 384.
Comp.; 35 bbls. per hr.; T.D. 2,488 ft.

Henderson & Harvey's No. 1 Wood-Welder, 330 ft. S and W lines, NE¼, SE¼, Sur. 381.
Location.

Humble O. & R. Co.'s No. 3 T. O. Smith, Sur. 382.
Drlg. sh. and lime 1,545 ft.

Mid-Continent Pet. Corp.'s No. 2 Serna, S½ N½ Sur. 384.
Drlg. plugs 2,478 ft.

T. P. Morgan's No. 1 Wood-Welder, Sur. 591.
Drlg. 1,400 ft.

Santa Clara Oil Co.'s No. 6 Wood-Welder, 990 ft. N and E lines, NW¼, Sur. 385.
Spudded in.

Santa Clara Oil Co.'s No. 10 Wood-Welder, 990 ft. S and E lines tract, Sur. 385.
Comp.; est. 27 bbls. per hr.; T.D. 2,487; T.P. 625 lbs.; C.P. 845 lbs.

Shell Pet. Corp.'s No. 1 Wood-Welder, 330 ft. N and E lines, 80-ac. tract, W½ SW¼, Sur. 385.
Drlg. 1,962 ft.

Hords Creek—Goliad County

Brown & Wheeler, Inc.'s No. 1 Kauffman, 1,650 ft. NW line, 330 ft. NE line, 4.-265.06-ac. tract, Trevino Sur.
T.D. 4,581 ft.; P.B. to 4,566 ft.; W.O.C.

M. I. Richardson's No. 1 Kaufan, 330 ft. NW and SW lines, 40-ac. tr.
Location.

Sun Oil Co.'s No. 1 Kaufman, 990 ft. SE line, 330 ft. SW line lease, Trevino Sur.
Digging pits.

North Pettus—Goliad County

Jane Oil Co.'s No. 5 Smith, 990 ft. SW line, 330 ft. SE line, B.&B. Sur. No. 35.
Derrick.

Southwest Darst Creek—Guadalupe

Amy Oil Co.'s No. 2 Katy Lay, 150 ft. N line, 342 ft. E No. 1, J. K. Davis Sur.
Location.

Doody Oil Co.'s No. 2 Larison, 160 ft. W line, 300 ft. NE No. 1, Dewitt Sur.
Location.

Stegal & Gallagher's No. 2 Lay, 20-ac. tr., Davis Sur.
Location.

Mercedes—Hidalgo County

Union Sulphur Co.'s No. 5 American Rio Grande L. & I. Co., 220 ft. N line, 350 ft. W line, Tract 2,082.
Setting whipstock 7,400 ft.; to sidetrack.

Union Sulphur Co.'s No. 6 American Rio Grande L. & I. Co., Tract 2,358, Blk. 49.
Drlg. shale 7,250 ft.

Samfordyce—Hidalgo County

J. H. Anderson's No. 1 Guerra, 232 ft. N line, 285 ft. W line, Tract 254, Por. 39.
Location.

Weekly Oil Corp.'s (Cortez) No. 2 Guerra, Tract 12, Porc. 41.
Sat.sd. 2,758-64 ft.; set csg.; to perforate for completion.

Weekly Oil Corp.'s (Cortes) No. 3-C Smith, 330 ft. from N line, 690 ft. from W line of NE 40 acres of Tract B-3, Porcion 41.
Location.

Weekly Oil Corp.'s (Cortes) No. 3-C Smith, 330 ft. from N line, 1,150 ft. from W line of NE 40 acres of Tract B-3, Porcion 41.
Location.

Ralph E. Fair, Inc.'s (Kingwood) No. 4 Guerra, 165 ft. S line, 1,150 ft. E line, Share 12, Por. 41.
Location.

Harrison, Davis & Bishop's No. 1 Guerra, 330 ft. S line, 616 ft. W line, S 40-ac., Tract 12, Por. 41.
M.L.M.

Harrison-Davis-Bishop's No. 6 Guerra, 330 ft. N and E lines, 40-ac. tract, Tract 12, Por. 41.
Drlg. sh. 1,115 ft.

Harrison-Davis-Bishop's No. 7 Guerra, 330 ft. N line, 623 ft. E line, 40-ac. tract, Tract 12, Por. 41.
Location.

Harrison-Davis-Bishop's No. 8 Guerra, 330 ft. N line, 1,083 ft. E line, 40-ac. tract, Tract 12, Por. 41.
Location.

Harrison-Davis-Bishop's No. 9 Guerra, 330 ft. N and W lines, 40-ac. tract, Tract 12, Por. 41.
Location.

Hill & Hill's No. 1 Guerra, 150 ft. S and W lines, NE 12.5-ac., S 75-ac.; Tract 254, Porc. 40.
Building derrick.

W. F. Lacey's No. 1 Seabury, 330 ft. N and W lines, NE 10-ac., SE 51-ac., Tract 256, Por. 38.
Comp.; est. 4 bbls. per hr. on ¼-in. choke; sd. 2,785-88.5 ft.; T.P. 125 lbs.; C.P. 225 lbs.

W. F. Lacey's No. 2 Seabury, 350 ft. N and E lines, NE 10-ac., SE 51-ac., Tract 256, Por. 38.
Location.

W. F. Lacey's No. 1 Lula George, 75 ft. S and W lines, 5-ac. tract, Tract 13, Por. 41.
Location.

W. F. Lacey's No. 2 Lula George, 75 ft. S and W lines, 10-ac. tract, Tract 13, Por. 41.
Location.

W. F. Lacey's No. 3 Lula George, 75 ft. S line, 550 ft. W line, 10-ac. tract, Tract 13, Por. 41.
Location.

Mundy & Sons' No. 1 Guerra, 853 ft. W line, 1,275 ft. N line, Tract 12, Por. 41. P.B. 2,920-37 ft.; to perforate 2,753-68 ft.

E. Powell's No. 2 Lula George, 330 ft. S and E lines, 20.11-ac. tract, Tract 13, Por. 41.
Drlg. 530 ft.

Showers & Moncrief's No. 2 Guerra, Tract 254, Por. 39.
Sd. 2,762-84 ft.; sh. 2,784-95 ft.; sat. 2,795-99 ft.; set csg. and drlg. plugs.

North Pettus—Karnes County

Magnolia Pet. Co.'s No. 10 Porter, 330 ft. SW line of lease, 660 ft. NW No. 1.
Oil sand 3,670-80 ft.; building pumping derrick.

Kingsville—Kleberg County

Fidelity & Culbertson Exploration Co.'s No. 2 Henry, Lot 2, Blk. 49.
Location.

Dinero—Live Oak County

Smith & Storey's No. 2 Dinero Townsite, Jane Curry Sur.
Drlg. 5,165 ft.

Fort Merrill—Live Oak County

Slick-Urschel Oil Co.'s No. 1 Watson & Shipp, 330 ft. NE line, 990 ft. SE line lease, offset Mills Bennett's No. 1 discovery well.
Waiting on gasoline rig.

McNeill—Live Oak County

Bosco Oil Corp.'s No. 1 E. Mahoney, 155 ft. from NW line of J. H. Harvey tract, 2,109 ft. SW of highway in Mark Killelly Sur.
S.D. 75 ft.

Lion Oil Ref. Co.'s No. 1 Dobie, 990 ft. N and W lines, 410-ac. tract, G.H.&H. Sur.
T.D. 6,212 ft.; D.&A.

Luray Oil Co.'s No. 1 Little, NE offset, Whittington's No. 2 Little, M. M. Shipp Sur.
No report.

J. O. Whittington's No. 4 Little, 990 ft. S and E lines, Shipp Sur.
Location.

Jacob Pool—McMullen County

L. O. Ormsby's No. 3 Jacob, 1,000 ft. NE line, 150 ft. SE line, Sparks Sur. 4.
Spudded in.

Loma Oil Co.'s No. 41-A Jacob, 660 ft. N No. 40-A.
Drlg. 758 ft.

Texas Inland Oil Co.'s No. 1-B Lark, 150 ft. N and E lines, O'Boyle Sur.
Sand 962-82 ft.; set csg.; standing.

Chas. Weist's No. 1 Lark, 150 ft. S and W lines, NW¼, Sec. 114.
Rigging up.

Baldwin—Nueces County

Gilcrease Oil Co.'s No. 2 Sanders, 330 ft. S and E lines, 100-ac. tract, B.S.&F. Sur. No. 165.
Set csg. 4,053 ft.; drld. plugs and running liner.

Houston Oil Co.'s No. 4 Baldwin, 330 ft. N and E lines 425-ac. tract, B.S.&F. Sur. No. 165.
Location.

Magnolia Pet. Co.'s No. 4 Baldwin, 330 ft. N and W lines, 1,005-ac. tract, Sur. 165.
Drlg. 3,570 ft.

Magnolia Pet. Co.'s No. 2 Sanders, 330 ft. N and E lines, 100-ac. tract, B.S.&F. Sur. 165.
Set sur. csg.; W.O.C.

Saxet—Nueces County

Conservative Oil Co.'s No. 2 K. Hutchins, 330 ft. S line, 430 ft. W line, Blk. 29.
Blew out at 1,040 ft.; sulfur water and gas; killed with cement.

Houston Oil Co.'s No. 2 Hunter, 330 ft. S and E lines, lease, Sur. 586.
Set csg. 1,045 ft.; W.O.C.

Houston Oil Co.'s No. 5 Walton, 330 ft. NE line, 542.28-ac. tr., Villareal Survey.
Location.

Houston Oil Co.'s No. 7 Morgan, 330 ft. N and W lines, 494.8-ac. tr., Sec. 7.
Location.

Houston Oil Co.'s No. 8 Morgan, 330 ft. N line, 967 ft. W line, 494.8-ac. tr., sec. 7.
Location.

Houston Oil Co.'s No. 3 Harrell, 330 ft. N and E lines, Block 19, Sheppard Farm Lots.
Location.

Houston Oil Co.'s No. 3 Hunter, 330 ft. S and W lines, 159.87-ac. tr., Sur. 586.
Location.

Houston Oil Co.'s No. 2 Isensee, 330 ft. S and E lines, 40-ac. tract.
Rigging up.

Houston Oil Co.'s No. 5 Macgregor, 330 ft. SW cor., 135-ac. tract, 660 ft. NW No. 4, Sur. 311.
Sand 4,863-71 ft.; comp.; est. 500 bbls. per day; T.P. 245 lbs.; C.P. 745 lbs.

Magnolia Pet. Co.'s No. 2 Sanders, 330 ft. SW cor. 110-ac. tract, Sec. 165, B.S.&F. Sur.
Derrick.

Republic Natural Gas Co.'s No. 11 Dunn, 330 ft. S line, 660 ft. SE No. 10.
Drlg. 1,910 ft.

Shell Pet. Corp.'s No. 2 Isensee, 330 ft. S and W lines of 136-ac. tract, C. Land Sur. Ran Schlumberger; reamed hole to 4,848 ft.; running casing.

Southern Minerals Corp.'s No. 1-A Isensee, 330 ft. E line, 990 ft. N line, 47-ac. tract, Sur. 404.
T.D. 1,000 ft.; W.O.C.

Southern Minerals Corp.'s No. 3 Sally Page, 330 ft. S and E lines, 75-ac. tract, Sur. 586.
Skidding over.

Texon Royalty Co.'s No. 1 Taggert, 330 ft. N and E lines, Block 5, Sur. 401.
Location.

Texon Royalty Co.'s No. 2 Isensee, center 15-ac. tract, 900 ft. N No. 1.
Drlg. 4,075 ft.

Plymouth—San Patricio County

Conroe Drlg. Co.'s No. 2 D. Welder, Sec. 47.
Drlg. shale 2,400 ft.

Heep Oil Corp.'s No. 4-F Welder, 728 ft. S No. 3-F, 752 ft. N No. 3-F, 200-ac. tract "F," Sec. 46.
T.D. 5,650 ft.; flowing into pits; comp.; flowing with gas.

Magnolia Pet. Co.'s No. 3 Corpus Christi Bank, 660 ft. S No. 2.
T.D. in shale 5,702 ft.; D.S. test 5,655 ft., 8 min., 700 ft. S.W.

Plymouth Oil Co.'s No. 18-C Welder, 3,591 ft. N line, 1,431 ft. W line, Sec. 48.
T.D. 5,629 ft.; comp. 200 bbls. per day.

Plymouth Oil Co.'s No. 19-C Welder, 2,307 ft. W line, 3,116½ ft. N line, Sec. 48.
T.D. 5,618 ft.; prepare to test.

Plymouth Oil Co.'s No. 20-C Welder, 2,333 ft. W line, 1,968 ft. N line, Sec. 48.
Drlg. shale and lime 3,740 ft.

Plymouth Oil Co.'s No. 21-C Welder, 466 ft. W line, 2,332 ft. S line, Sec. 71.
Drlg. sand and shale 336 ft.

Sun Oil Co.'s No. 2 Hunt, Blk. 24, Lot 5.
Drlg. 3,178 ft.

Barbacoas—Starr County

T. K. Irwin et al's No. 1 S.C.C.C., 150 ft. S and W lines, Blk. 58, Por. 89.
Cored sand 2,648-50 ft.; good show; waiting orders.

Rio Grande—Starr County

Hiram Reed's No. 1 Davis, 835 ft. W line, 150 ft. S line, Lot 16, Tract 78, Por. 61.
Drlg. 1,580 ft.

W. W. Zimmerman's No. 3 D.&C., 522 ft. W line, 450 ft. S line, Blk. 1, Tract A-77, Por. 81.
Oil sand cored 1,464-71 ft.; drlg. plugs.

Samfordyce—Starr County

Phillips & Barnsdall's No. 2 Yturria S. & S. Co., 2,080 ft. S line, 330 ft. W line, 110-ac. tract, Por. 100.
Drlg. shale 1,880 ft.

Porter & Pickens' No. 1-B Garcia Land & Cattle Co., 280 ft. N line, 380 ft. E line, 60-ac. tract, NW cor. Blk. 4, Porc. 108.
Skidded 50 ft. to third location; set surface csg. 201 ft.; W.O.C.

Porter & Pickens' No. 2-B Garcia Land & Cattle Co., 330 ft. N and W lines, 60-ac. tract, NW cor. Blk. 4, Por. 100.
Location.

Porter & Pickens' No. 3-B Garcia Land & Cattle Co., 330 ft. W line, 914 ft. S line, 40-ac. tract, Blk. 5, Por. 100.
Location.
Skelly Oil Co.'s No. 7 Seabury, 219 ft. S line, 331 ft. W line, NW 20-ac. tract, Tract 256, Por. 38.
Cored oil sand 2,773-91½ ft.; comp.; 5 bbls. per hr. on ⅛-in. choke.
Skelly Oil Co.'s No. 8 Seabury, 219 ft. N line, 198 ft. W line, 12-ac. tract, Tract 256, Por. 38.
Location.
Skelly Oil Co.'s No. 9 Seabury, 330 ft. N line, 230 ft. W line, 24-ac. tract, Tract 256, Por. 38.
Set surface csg. 200 ft.; W.O.C.
Skelly Oil Co.'s No. 10 Seabury, 440 ft. N line, 230 ft. E line, 24-ac. tract, Tract 256, Por. 38.
Location.
Skelly Oil Co.'s No. 6 Seabury, 219 ft. S line, 248 ft. E line, E 15-ac., NW 30-ac., S 263.8-ac., Tract 256, Por. 38, J. of Reynosa.
Location.

Bruni—Webb County

O. W. Killam's No. 42 Bruni, Blk. 30, Sur. 15, Arispe grant.
Dry and abd. 3,023 ft.

Lopez—Webb County

C. F. Lewis' No. 2 Lopez, 330 ft. N and W lines, Sur. 110.
Location.
Mills Bennett Prod. Co.'s No. 1 Montemayor, Sur. 114.
Location.
Mills Bennett Prod. Co.'s No. 3 M. Lopez, 330 ft. N and W lines, 100-ac. tract, Sur. 73.
Sand 2,220-27 ft.; comp.; 8 bbls. per hr. on ½-in. choke.
Mills Bennett Prod. Co.'s No. 1 A. Lopez, SW cor. tract, Share 13, Tract 111.
Location.
G. G. Mortimer's No. 3 M. Lopez, Sur. 73.
Location.
G. G. Mortimer's No. 1-A J. Lopez, 990 ft. W line, 330 ft. S line, Sur. 111.
Rigging up.
Nixon & Tabot's No. 1 Billings, 990 ft. E line, 975 ft. S line, Sur. 113.
Sand 2,170-77 ft.; D.S. test 2,172-77 ft.; 375 ft. oil in 10 min.; setting csg.
Superior Oil Co.'s No. 1 Billings, 330 ft. N and E lines, Sur. 109.
Drlg. 1,760 ft.

West Cole Pool—Webb County

James P. Goslin's No. 2 Benavides, 347 ft. NW line, 313 ft. SW line, Blk. 220.
Drlg. 1,370 ft.

Laurel—Webb County

South Texas Oil Co.'s No. 2 Laurel, Sur. 359.
T.D. 2,081 ft.; running Schlumberger.

O'Hern—Webb County

Magnolia Pet. Co.'s No. 18 Brennan-Benavides, C Blk. 328, Hale Subd., Arispe grant.
Location.
Magnolia Pet. Co.'s No. 5-X Benevides, cen. Blk. 119.
Coring 2,810 ft.
Magnolia Pet. Co.'s No. 10 G. Benavides.
Sand 2,751-58 ft.; W.O. pump.
Magnolia Pet. Co.'s No. 6 Brennan-Benavides, center Blk. 326.
No report.
J. J. O'Hern's No. 2 Brennan-Benavides, Blk. 189.
Sand 2,750-62 ft.; comp.; 12 bbls. per hr. on ½-in. choke.
Texas Co.'s No. 7 Brennan-Benavides, C Blk. 355, Hale Subd., Arispe grant.
Location.

Escobas—Zapata County

Clover Oil & Gas Co. and J. P. Nash's No. 1 Haynes, 500 ft. SW line, 150 ft. NW line, Blk. 7.
Coring 835 ft.
S. R. C. Oil Corp.'s No. 16-A Trevino, 2,640 ft. E line, 330 ft. S line, Sur. 66.
Location.
Texas Co.'s No. 79 Whitehead, Cerrito Blanco grant.
Location.
Texas Co.'s No. 78 Whitehead, Cerrito grant.
Sand 1,191-1,231 ft.; comp. 13 bbls. per hr. on pump; T.D. 1,213 ft.

WEST TEXAS WILDCATS

Week Ending November 9

Brewster County

F. C. Dodson's No. 1 Texas American Syndicate, 660 ft. from N and E, Sec. 66 Blk. 10, G.H.&S.A. Sur.
T.D. 1,715 ft.; R.U. on new location.
Joiner et al's No. 1 McIntyre, 353 ft. from S, 2,290 ft. from E of Sec. 21, Blk. 352 W. M. Mitchell Sur.
S.D. 2,150 ft.
King & Franklin's No. 1 Gage Est., C Sec 138, Blk. 22, G.H.&S.A. Sur.
Elev. 4,244 ft.; S.D. 1,608 ft.
G. H. Storey's No. 1 Wilson, 1,980 ft from N and E lines of Sec. 3, Blk. 212 T.&St.L. Sur.
Elev. 3,609 ft.; S.D. 1,875 ft.

Cochran County

Humble Oil & Ref. Co.'s No. 1 C. D Slaughter, 5,600 ft. from S and 6,000 ft from E lines of League 135, Armstrong County School Lands
T.D. 3,958 ft.

Coke County

Haggerty et al's No. 1 Gaston, 340 ft. from S and 654 ft. from W, Sec. 11, Jos. Young Sur.
S.D. 3,250 ft.

Concho County

Maverick Oil Co.'s No. 1 Jim Rice, 330 ft. from S and W lines of NW¼ of Sec. 18, S.N. Ry. Sur.
S.D. 150 ft.
John W. Westbrook's No. 1 Ledbetter, 1,950 ft. from N and 3,300 ft. from E lines of Sec. 2, Sur. No. 1,673.
S.D. 600 ft.

Crane County

Big Basin Pet. Corp.'s No. 1 Cowdin, 330 ft. from N and 1,650 ft. from E, sec. 77, Blk. X.
Spudded and S.D.
Gulf Prod. Co.'s No. 1 Waddell, C NW NW Sec. 4, Blk. B-27, P.S.L. Sur.
Coring 6,333 ft.; top Simpson 6,060 ft.
Wahlenmaier Pet. Corp.'s No. 2 Kloh, 330 ft. from S and W, Sec. 33, Blk. 44, Twp. 3s, T.&P. Sur.
Drlg. 2,606 ft.

Crockett County

Leslie-Hiller et al's No. 1 Todd, 1,200 ft. N and 330 ft. E, Sec. 36, Blk. WX, G.C.&S.F. Sur.
S.D. 821 ft.
John I. Moore's No. 1 A. C. Hoover, 330 ft. from S and E lines of Sec. 4, Blk. FF B.&B. Sur.
Spudded and shut down.

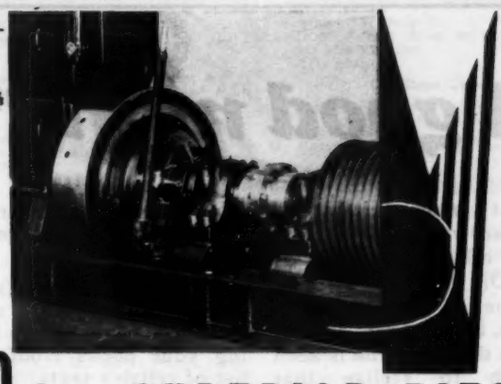
Culberson County

Anderson-Prichard Oil Corp., Magnolia Pet. Co. et al's No. 1 Borders, 1,255 ft. N and 2,305 ft. from W, Sec. 34, Blk. 69, P.S.L. Sur.
Drlg. 2,710 ft.

Dawson County

Adams & Turner's No. 1 John Robinson, 1,320 ft. from N line, 1,320 ft. from W

At the third and best well completed in the Lueders Pool, Jones County. Left to right: Sol Sanders, superintendent, Algord Oil Co.; S. A. Gulberson, Jr., one of the owners; Reta Dallas, tool dresser on well; J. D. Dallas, Jr., driller; Art Frazier, one of the owners; L. (Curley) Arnold, tool pusher



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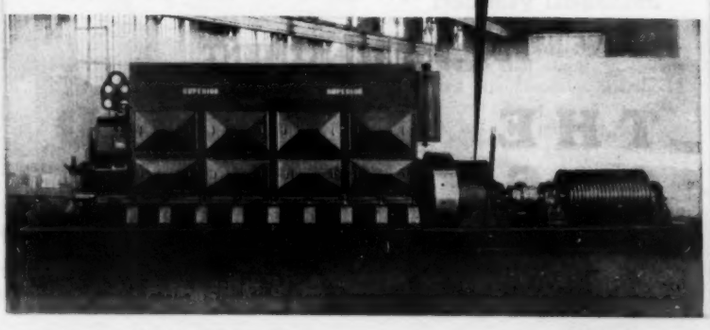

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line of Sec. 46, Blk. M, E.L.R.R. Sur. S.D. 4,860 ft.

Ector County

W. P. Dunning, Jr., et al's No. 1 Mrs. Clarence Scharbauer, 440 ft. from S and 2,200 ft. from W lines of Sec. 33, Blk. 44, Twp. 1n, T.&P. Sur.
S.D. 1,620 ft.

Gulf Prod. Co.'s No. 2 Goldsmith, 440 ft. from S and E, Sec. 22, Blk. 44, Twp. 1s, T.&P. Sur.
Drlg. 3,580 ft.

Gulf Prod. Co.'s No. 3 Goldsmith, 3,200 ft. from N and 440 ft. from E lines of Sec. 15, Blk. 44, Twp. 1s, T.&P. Sur.
S.D. 3,785 ft.

Empire G. & F. Co.'s No. 2 Wight, 440 ft. from N and W, Sec. 2, Blk. 43, Twp. 1s, T.&P. Sur.
S.D. 4,275 ft.; T.P. 4,113 ft.; to run tubing.

Sinclair Prairie Oil Co.'s No. 2 Wight, 2,200 ft. from N and 440 ft. from E, Sec. 10, Blk. 43, Twp. 1s, T.&P. Sur.
Drlg. 4,055 ft.

Sun and Atlantic's No. 1 O. B. Holt, 1,980 ft. from S and 660 ft. from W lines of Sec. 6, Blk. 43, Twp. 1n, T.&P. Sur.
Drlg. 4,160 ft.

Sun Oil Co.'s No. 1 W. P. Edwards, 466 ft. from N and E lines of Sec. 20, Blk. 43, Twp. 2s, T.&P. Sur.
Drlg. 3,555 ft.

Roy Westbrook's No. 1 Yarbrough & Allen, 440 ft. from N and W, Sec. 26, Blk. B-14, P.S.L. Sur.
Elev. 2,824 ft.; S.D. 4,195 ft.

York & Harper's No. 1 H. C. Foster, 660 ft. S and E Sec. 13-43-2s, T.&P. Sur.
S.D. 2,000 ft.

Edwards County

O. L. Williams' No. 1 Holman, 300 ft. from N and E, Sec. 145, C.C.S.D.&R.G.N.G. Sur.
S.D. 1,000 ft.

Fisher County

L. A. Daniels et al's No. 1 J. J. Nickless, 1,700 ft. S and 2,070 ft. W of SW cor. of Sec. 60, H.T.&B. Sur., but in Sub. 1, G. W. Lawrence Sur., 6 miles E of Roby.
S.D. 530 ft.

Tide Water's No. 2 Howard, 1,620 ft. from N and 1,550 ft. from E lines of Sec. 140, Blk. 2, H.&T.C. Sur.
Drlg. 2,980 ft.

Tide Water Oil Co.'s No. 1 Newman, 1,758 ft. from N and 1,054 ft. from W of NE¼ Sec. 2¼, John Rodman Sur., 4 miles SE of Roby.
Drlg. 3,165 ft.

Gaines County

Stogner's No. 1 Kirk, SW¼ Sec. 28, Blk. A-21, 5 miles S of Seminole.
Location.

Wahlenmaier Pet. Co. et al's No. 1 E. H. Jones, 660 ft. S and W, Sec. 414, Blk. G, C.C.S.D.&R.G.N.G. Sur., 23 miles NW of Seminole.
S.D. 92 ft.

W. T. Walsh et al's No. 1 Averitt, 330 ft. N and E lines Sec. 228, Blk. G, W.T.R.R. Sur.
Elev. 3,322 ft.; gas show 2,785 ft.; increase 2,795 ft.; T.D. 2,818 ft.; set csg.

Garza County

Dobbs Oil Co.'s No. 1 W. E. Connell, 330 ft. from SW of NW ¼ Sec. 75, Blk. 5, G.H.&H. Sur.
Drlg. 2,750 ft.

Glasscock County

John L. Moore et al's No. 1 J. S. McDowell, 1,980 ft. from N line and 660 ft. from E line of Sec. 22, Blk. 34, Twp. 2s, T.&P. Sur.
Topped lime 9,471 ft.; show oil and gas 9,484-9,520 ft.; increase oil 9,594-9,600 ft. and 9,633-55 ft.; T.D. 10,115 ft.; made 150-bbl. flow when opened on test.

Howard County

T. P. Coal & Oil Co.'s No. 1 Douthit, 400 ft. from S and 2,310 ft. from W, Sec. 116, Blk. 29, W.&N.W. Sur.
S.D. 1,435 ft.; to shut off wtr.

John L. Moore et al's No. 1 Snyder, 330 ft. from S and W, Sec. 28, Blk. 30, Twp. 1s, T.&P. Sur.
Elev. 2,302 ft.; T.D. 3,010 ft.; pumping 12 bbls. oil per day.

Jeff Davis County

C. M. Joiner's No. 1 Jones & Coffield, 770 ft. from N and 1,322 ft. from E, Sec. 8, Blk. 2, H.&T.C. Sur.
S.D. 1,610 ft.

Jones County

Campbell et al's No. 1 Rowell, in E half of W half, Sec. 6, T.&P. Sur.
S.D. 2,529 ft.

Conway & Gholson's No. 1 Cauthen, 150 ft. from S and W lines of Sec. 24, G. A. Williams Sur.
Drlg. 1,780 ft.

Scurry County

Coffield & Guthrie's No. 1 Wade, 990 ft. from N and 330 ft. from W, Sec. 115, Blk. 97, H.&T.C. Sur.
Drlg. 2,640 ft.

Magnolia Pet. Co.'s No. 1 W. M. Scott, 330 ft. from S and W, Sec. 184, Blk. 3, H.&G.N. Sur., 5 miles S of Snyder.
Elev. 2,341 ft.; fishing 3,975 ft.

Sutton County

Fleetborn Oil Corp.'s No. 1 G. S. Allison, 660 ft. from S and W, Sec. 49, Blk. A, G.W.T.&P. Sur.
Ready to spud.

Taylor County

Brown Eagle Oil Co.'s No. 1 C. M. Caldwell, 175 ft. from N and 265 ft. from E, 170-ac. tract, Sec. 82, Blk. 14, T.&P. Sur
Drlg. 1,575 ft.

Tom Green County

Mays Oil Co.'s No. 1 I. Funk, 1,980 ft. from S and 660 ft. from W, Sec. 38, Blk 5, H.&T.C. Sur.
T.D. 990 ft.; ran csg.

Twin Oil Co.'s No. 1 W. E. Green, 1,650 ft. from N and 1,400 ft. from W. L. P Moore Sur. 169½.
S.D. 315 ft.

Upton County

Humble O. & R. Co.'s No. 1 Pollock, C of NW Sec. 4, Blk. M.
Drlg. 10,975 ft.

J. G. McKenzie's No. 1 Taylor, 1,650 ft. from S and 330 ft. from E lines of Sec. 22, Blk. B-2, G.H.&S.F. Sur.
T.D. 630 ft.

W. C. Ray's No. 1 Cordova-Union, 2,633 ft from S and 2,895 ft. from W of NE¼ Sec. 3, A.B. Sur., 5 mi. SE of McCamey.
T.D. 2,111 ft.; pumped 96 bbls. in 8 hrs.

A. E. Lynch et al's No. 1 Sherk, 330 ft. from N and E, Sec. 25, Blk. 2, M.K.&T. Sur., 2 mi. E and 8 mi. N of McCamey.
S.D. 470 ft.

Ward County

Abell Brothers' No. 1 Lancaster Estate, 294 ft. N 20 degrees and 15 minutes W of NE cor. Sec. 61, Blk. 8, H.&G.N. Sur. in Pecos County, 5½ miles down Pecos River from NW cor. of Pecos and E cor. of Reeves County.
Spudded and shut down.

Alexander's No. 1 Richter, 1,650 ft. from NW, 1,170 ft. from NE line of Sec. 37, Blk. 34, H.&T.C. Sur.
S.D. 2,463 ft.

California Co. et al's No. 1 McFarland, 990 ft. from NE and 330 ft. from SE Sec. 29, Blk. 34, H.&T.C. Sur.
T.D. 2,580 ft.; testing.

C. Cochran's No. 1 K. Greene, 990 ft. from NW and 2,980 ft. from SW, Sec. 29, Blk. B-29, P.S.L. Sur.
Fishing 765 ft.

Empire G. & F. Co.'s No. 2 Smith, 990 ft. from N and 1,650 ft. from E, Sec. 5, Blk. F.
Fishing 3,060 ft.

Stanolind O. & G. Co.'s No. 1 W. H. Martin, 1,650 ft. SW and 330 ft. from SE Sec. 40, Blk. 34, H.&T.C. Sur.
Coring 2,531 ft.

Wahlenmaier et al's No. 1 Potts, 990 ft. from SW and 330 ft. from SE, Sec. 31, Blk. B-29.
S.D. 70 ft.

Winkler County

Atlantic Oil Prod. Co.'s No. 1 Simmons, 2,310 ft. from S and 330 ft. from E Sec. 35, Blk. 26, P.S.L. Sur.
Location.

Crafton Oil Co.'s No. 2 Pure-Walton, 1,200 ft. N and E, Sec. 1, Blk. 3-B.
Material.

Crafton Oil Co.'s No. 1 Pure-Walton, 440 ft. E and 1,320 ft. S, Sec. 2, Blk. 3-B, P.S.L. Sur.
Set csg. 1,234 ft.

Cree & Hoover's No. 1 Crowe, 2,310 ft. from S and 330 ft. from W, Sec. 14, Blk. B-5.
S.D. 3,270 ft.; bailed dry.

Emperor Oil Co.'s No. 1 Continental-Holley, 330 ft. from S and 2,310 ft. from W, Sec. 12, Blk. B-12.
S.D. 555 ft. to set csg.

Gulf Prod. Co.'s No. 3 Keystone Cattle Co., 330 ft. from N and W of NE¼ Sec. 11, Blk. B-3.
T.D. 3,765 ft.; P.B. 3,320 ft.

Gulf Prod. Co.'s No. 4 Keystone Cattle Co., 330 ft. from N and E, Sec. 20, Blk. B-3.
T.D. 3,756 ft.; P.B. 3,375 ft.; S.D.

Gulf Prod. Co.'s No. 8 Keystone Cattle Co., 330 ft. from S and W of Sec. 13, Blk. B-2.
Elev. 2,964 ft.; T.D. 4,463 ft.; cleaned out 4,135 ft. and shut; no increase.

Gulf Prod. Co.'s No. 9 Keystone Cattle Co., 330 ft. from S and W of Sec. 13, Blk. B-2.
Elev. 2,946 ft.; S.D. 4,126 ft.

K-D Oil Co.'s No. 1 P. Mitchell, 1,650 ft. from N and 2,310 ft. from E, Sec. 32, Blk. B-10, P.S.L. Sur.
Cable tools rigged up.

Mascho Oil Co.'s No. 1 Evans, 1,320 ft. from N and W, Sec. 8, Blk. 56.
S.D. 80 ft.

Mascho Oil Co.'s No. 1 Evans, 1,170 ft. from N and 1,320 ft. from W, Sec. 46, Blk. 73, P.S.L. Sur.
S.D. 217 ft.

Richardson's No. 1 B. F. Jenkins, 440 ft. from S and E, Sec. 13, Blk. 77, P.S.L.
T.D. 3,498 ft.; cleaning out; flowed 60 bbls. in 10 hrs. by heads.

Skelly Oil Co.'s No. 3 Halley, 2,300 ft. from N and 1,320 ft. from E, Sec. 36, Blk. B-11.
T.D. 3,355 ft.; P.B. 2,985 ft.

Sinclair Oil Co.'s No. 1 Lowett, 330 ft. from N and E, Sec. 36, Blk. 26, P.S.L. Sur.
T.D. 3,130 ft.; P.B. 3,091 ft.; shut in; S.D. 2,371 ft.; set csg.

Sun Oil Co.'s No. 1 Crow, 440 ft. from S and W, Sec. 23, Blk. B-5.
Set pipe 3,454 ft.

Sun Oil Co.'s No. 1 Walton, 2,200 ft. from S and 440 ft. from E, Sec. 8, Blk. B-3.
S.D. 3,207 ft.; testing.

Westbrook's No. 1 Brown & Altman, 1,

310 ft. from N and E, Sec. 5, Blk. B-6
Drlg. 3,060 ft.

Thurman et al's No. 1 Seth Campbell 18-B-3, 330 ft. from S and 1,650 ft. from W lines of Sec. 18, Blk. B-3, P.S.L. Sur
3,800 ft.; S.D.

Wahlenmaier et al's No. 1 Walton, 990 ft. from S and 330 ft. from E, Sec. 3, Blk. 16.
Location.

Wilco Oil Corp.'s No. 1 Campbell, 900 ft from N and 300 ft. from E Sec. 2, Blk 5, P.S.L. Sur., 3 miles E of Kermit.
Elev. 2,884 ft.; T.D. 4,639 ft.; P.B 3,800 ft.; S.D.

Yoakum County

C. J. Davidson et al's No. 1 Bennett, 1, 330 ft. from N and E, Sec. 678, John H. Gibson Sur.
Elev. 3,557 ft.; T.D. 5,090 ft.; shut down for 7-in. casing with 800 ft. oil in hole, show gas 3,400-10 ft. and 5,085-90 ft.; ran csg.; set 6⅝-in. csg. at 4,651 ft., C.O. to 15 ft. off bottom; 2,000 ft. fluid in hole, mostly oil.

J. N. Cooper's No. 1 W. E. Robinson, 660 ft. from S and E, Blk. 7, L. Matthews Sur.
Location.

R. L. Crawford et al's No. 2 Waltzer, 200 ft. from S and 532 ft. from W, Sec. 1, Blk. 2, T.&N.O. Sur.
S.D. 1,919 ft.

Farris & Fikes No. 3 Jennings, 220 ft. from S and W of NE of SE¼, Sec. 207, B.B.&C. Sur.
Machine rigged up.

Farris & Fikes' No. 1-A Jennings, 1,980 ft. from S and 150 ft. from W, Sec. 1 L.&G.N. Sur.
Machine.

Golden Pet. Co. and Cochran's No. 1 J. J. Steele, 150 ft. from N and W, Sub. 7, R. Grimes Sur. No. 8.
Drlg. 669 ft.

Herring & Hodges' No. 1 Mrs. C. D. Cowsart, 200 ft. from N and W, Sec. 42, Orphan Asylum Lands.
Spudded and S.D.

Humphrey-Guiberson Oil Corp.'s No 1 Jennings, 220 ft. from N and 2,420 ft. from W. Sec. 207, B.B.B.&C. Sur.
Drlg. 1,750 ft.

Humphrey-Guiberson Oil Corp.'s No. 1 Swenson, 220 ft. from N and 1,540 ft. from W. Sec. 1, L.&G.N. Sur.
Drlg. 1,880 ft.

Tom D. Medders et al's No. 1 J. E. Manley, 1,170 ft. from S and E lines of Sec. 35, Blk. 14, T.&P. Sur.
Drlg. 1,525 ft.

Reliance Oil Co.'s No. 1 Crow, 660 ft. from S and 1,320 ft. from E lines of Sec. 9, D.&D.A. Sur.
Location.

Sandy Ridge Oil Co.'s No. 3 Jones, 1,520 ft from N and 660 ft. from W. Sec. 5, Blk 15, T.&P. Sur.
Drlg. 775 ft.

Sanders et al's No. 1 J. A. Martin, 220 ft. from S and E. Sec. 205, B.B.B.&C. Sur.
Drlg. 570 ft.

Shaheen et al's No. 1 J. J. Steele, 660 ft. from S and 1,980 ft. from E, Sec. 11, Blk. 15, T.&P. Sur.
S.D. 1,060 ft.

T. K. Simmons' No. 1 Beatty, 220 ft. from S and E of Sec. 4, O.A.L. Sur.
Drlg. 1,781 ft.

Kimble County

Forrest Dev. Co.'s No. 1 Stopp, 660 ft. from N and 1,866 ft. from W, Sec. 682, Blk. N, G.H.&S.A. Sur., 18 miles SE of Junction.
Drlg. 447 ft.

Loving County

D. C. Evans' No. 1 W. D. Johnson, 2,310 ft. from N and 1,650 ft. from W, Sec 12, Blk. 57, Twp. 1, T.&P. Sur.
Drlg. 2,610 ft.

Mason Oil Co.'s No. 1 Kyle, 1,980 ft. from S and E, Sec. 22, Blk. 55, Twp. 1, T.&P Sur.
Top Delaware lime 3,912 ft.; top Delaware sand 3,946 ft.; S.D. 4,015 ft.

Martin County

Harris & Meyers' No. 1 L. T. Brook.
S.D. 135 ft.

William Hix' No. 1 O. B. Holt, C of Labor 12, League 319, Garza County School Lands.
Spudded and shut down.

Wright & Scott's No. 1 Flannigan, 330 ft N and E, Sec. 22, Blk. 37, Twp. 1a. T.&P Sur.
S.D. 100 ft. for casing.

McCulloch County

Mark Hill's No. 1 Moore Bros., 934 ft. from S and 150 ft. from E lines of Sec. 2, State School Land Sur.
T.D. 690 ft.; P.B. to 605 ft.

Poulter et al's No. 2 Wyrea, 50 ft. from S and 160 ft. from W, P. W. Rocins Sur
S.D. 1,542 ft.

Mitchell County

Lockhart et al's No. 1 W. C. Berry, 330 ft. from N and 2,310 ft. from E. Sec 8, Blk 97, H.&T.C. Sur.
Pulling pipe.

Sawtell & Grueber's No. 1 Morrison.
T.D. 2,810 ft.; P.B. to 2,800 ft.; acidized; pumped 60 bbls. fluid, 15% wtr.; 24 hrs

Southern Union Prod. Co.'s No. 1 Castin, 330 ft. from S and E, Sec. 11, Blk. 28, Is. T.&P. Sur.
Material.

Nolan County

Harris et al's No. 1 Georgia Institute of Technology, 330 ft. from S and 1,320 ft from W. Sec. 89, Blk. 24, T.&P. Sur.
S.D. 200 ft.

Pecos County

Ajax Drlg. Co.'s No. 1 University, 2,310 ft. from S and W, Sec. 13, Blk. 18.
Drlg. 100 ft.

C. R. Richards' No. 4 Courtney, 920 ft from N and W, Sec. 78, Blk. OW, 360 ft S of No. 2.
Elev. 2,967 ft.; S.D. 1,100 ft.

Tex-Mex Pet. Co.'s No. 1 Phillips-Brandenburg, 330 ft. from S and E of N half Sec. 42, Blk. 8, H.&G.N. Sur.
Drlg. 1,445 ft.

Trans-Pecos Oil Co.'s No. 1 F. W. Popham 1,650 ft. from S and E, Sec. 235, Blk. 11, G.H.&S.A. Sur.
To spud.

Trans-Tex. Oil Co.'s No. 1 Caldwell, 330 ft from E line and 330 ft. from S line of Sec. 27, Blk. 40, Twp. 9, T.&P. Sur
S.O. 3,905-4,000 ft.; 1 bailer oil in 48 hrs.; drlg. 4,680 ft.

Reagan County

Bahan & Rhodes' No. 1 Reed, 1,320 ft from N and W, Sec. 31, Blk. 35, Twp. 5a, T.&P. Sur.
Drlg. 1,700 ft.

Dobbs Oil Co.'s No. 2 Friend, 660 ft. from W and 1,375 ft. from S, Sec. 3, Wm. Allen Sur.
Location.

Skelly Oil Co.'s No. 6 Grayson, 1,320 ft. from N and 440 ft. from W, Sec. 33, Blk. 8, University Lands.
S.D. 577 ft.

Sun Oil Co.'s No. 1 L. W. Young, Sec. 1 G.C.&S.F. Sur., Abst. 170.
S.O. 2,385-90 ft.; top lime 2,340 ft.; fishing 2,682 ft.

Reeves County

Dunigan's No. 1 Davis, 330 ft. from N and W, Sec. 7, Blk. 58, P.S.L. Sur.
Location.

Grisham-Hunter Corp.'s No. 1 T. P. Land Trust, 1,320 ft. from S and W lines, Sec 27, Blk. 57, Twp. 2, T.&P. Sur.
Elev. 3,020 ft.; drlg. 2,230 ft.

Washington Oil Co.'s No. 1 J. M. Radford Grocery Co., 2,640 ft. from S and 340 ft. from E, Sec. 39, Blk. 56, P.S.L. Sur.
Elev. 3,169 ft.; T.D. 502 ft.

Runnels County

John Caster et al's No. 1 Giesecke, 330 ft from N and 713 ft. from E, Sub. 3, Blk. 130, J. Hughes Sur. 227.
S.D. 502 ft.

Schleicher County

John M. Cooper et al's No. 1 Bert Page, 1,290 ft. from N line, 1,470 ft. from W line of Sec. 40, Blk. L, G.H.&S.A. Sur
T.D. 6,257 ft.; P.B. to 5,555 ft.; acidized and made estimated 6,000,000 ft gas; C.O. to bottom.

W. C. Proctor et al's No. 1 Judkins & Spencer, C SW ¼ Sec. 4, Blk. V-28.
S.D. 2,205 ft.

Texas Panhandle Wildcats

Week Ending October 26

Carson County

Danube Oil Co.'s No. 1 Bryan, 308 ft. from N and 409 ft. from E of N½ of NE¼ Sec. 107, Blk. 4, L&G.N. Sur.
T.P. 3,095 ft.; T.D. 3,167 ft.; P.B. to 3,150 ft.; S.D.

Robert Watchorn's No. 1 Eller, 330 ft. from S and E lines of W½ and SE¼ of Sec. 9, Blk. 7, H.&G.N. Sur.
T.D. 3,801 ft.; P.B. to 3,050 ft.; drlg. by pipe 2,709 ft.

Childress County

Alma Oil Co.'s No. 1 Lowe, 660 ft. from N and W of SW¼ Sec. 417, Blk. H, W.&N.W. Sur., 8 of Kirkland.
S.D. 3,234 ft.; P.B. 5,652 ft.; perforated csg.; 24 holes from 5,670-80 ft.; showing some oil; bailing S.W.

K. T. Wilson et al's No. 1 Scruggs, 1,320 ft. from S and W lines of SW¼ of Sec. 495, Blk. H, W.&N.W. Sur.
Water well drilled.

Collingsworth County

Tom Hunter et al's No. 1 Tinsley, 660 ft. from S and 1,020 ft. from E of NE¼ Sec. 8, Blk. 13, H.&G.N. Sur.
Rigged up standard tools.

Smith Bros.' No. 1 Pierce, C NE¼ Sec. 107, Blk. 21, H.&G.N. Sur.
S.D. 2,830 ft.

Gray County

Blackwell O. & G. Co. et al's No. 1 Furneaux, 330 ft. from S and E lines of SW¼ of Sec. 110, Blk. B-2, H.&G.N. Sur.
Material.

Drilling Exploration Co.'s No. 1 Lapold, 330 ft. S and W, Sec. 141, Blk. 3, L.& G.N. Sur.
Material.

Hagy et al's No. 1 Chadwick, 330 ft. N and E, Sec. 210, Blk. B-21, H.&G.N. Sur
T.D. 3,325 ft.; P.B.; est. 11,000,000 ft. gas.

Harry Foster's No. 1 Johnson, 330 ft. from N and E lines of Sec. 21, L. L. Erwin Sur.
S.D. 700 ft.

Plains Holding Co.'s No. 1 Morse-Gulf 330 ft. S and W, Sec. 57, Blk. 25, H.&G.N. Sur.
Derrick.

Salisbury Oil Co.'s No. 1 Carpenter, C NE¼ Sec. 37, Blk. 25, H.&G.N. Sur.
Drlg. 2,870 ft.; hole full oil.

Taylor Oil Co.'s No. 2 W. H. Taylor, 1,320 ft. from N and W lines of NW¼ of Sec. 79, Blk. B-2, H.&G.N. Sur.
T.D. 2,960 ft.; shot and C.O.

Hall County

Davis et al's No. 1 Knorpp, 330 ft. S and W, Sec. 7, Blk. A, A.B.&M. Sur.
Spudded and shut down.

Phillips Pet. Co.'s No. 1 Hughes, C N½ Sec. 4, Blk. H, H. Stephens Sur.
Derrick.

Hartley County

O V. Beck et al's No. 1-A Matador ranch, 350 ft. from N and 385 ft. from W of most northerly NW cor. Sec. 20, Blk. 22, C.S.S. Sur.
Drlg. 2,730 ft.

Hutchinson County

Burnett's No. 1 Ingerton, 770 ft. from S and 1,320 ft. from W, Sec. 327, Blk. Z, E.L.R.R. Sur.
Drlg. 210 ft.

Phillips Pet. Co.'s No. 1 Fromma, 2,640 ft N and 660 ft. E of W½ of E½ Sec. 2, Blk. 1, B.&B. Sur.
S.D. 2,735 ft.; gas pay 2,375 ft.

Power Pet. Co.'s No. 1 Hodges, 660 ft. S and E of most southerly 80 acres of S 160 acres of SE 200 acres, Sec. 16, Blk M-35, T.C. Sur.
Rig.

Stinnett Oil Co.'s No. 1 Starnes, 330 ft from N and 275 ft. from W of E½ of NW¼ Sec. 22, Blk. M-23, T.C. Ry. Sur
S.D. 2,765 ft.

H. J. Wasson's No. 1 Haile, 330 ft. from S and W, NW 120 ac., Sec. 5, Blk. M-21, T.C. Sur.
Cellar.

Moore County

Anderson & Kerr's No. 1 Wilson, 660 ft. from S and E, Sec. 209, Blk. 3-T, T.&N.O. Sur.
Rigged up rotary.

Anderson & Kerr's No. 1 Wilbur, 660 ft. from S and E lines of NW¼ of Sec. 226, Blk. 3-J, T.&N.O. Sur.
S.D. 2,702 ft.

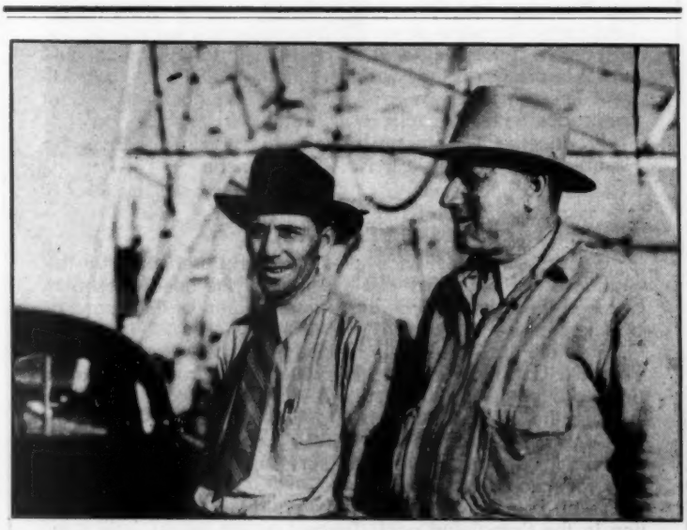
Wheeler County

Allender & Heare's No. 1 Harvey, 330 ft. from S and W lines of E½ of SW¼ of Sec. 67, Blk. 13, H.&G.N. Sur.
Drlg. 422 ft.

Sunray Oil Co.'s No. 1 Tinley, 330 ft. from N and E of SE¼ Sec. 26, Blk. 24, H.&G.N. Sur.
S.D. 1,922 ft.

Ochiltree County

James R. Macon's No. 1 W. R. Norris, 330 ft. S and 990 ft. E, Sec. 212, Blk. 43, H.&T.C. Sur.
Moving in heavy duty equipment.



J. H. Masterson, drilling contractor of Arp, and John Marks, superintendent of the Big Indian Oil & Development Co., Gainesville, Tex.

Michigan Leases

MUSKEGON, Mich., Nov. 11.—James M. Packer, of Saginaw, was the low bidder for oil and gas rights on the first upper peninsula tract ever offered by the state conservation department in a state lease sale at Lansing.

Mr. Packer bid $24 for mineral rights on 1,320 acres of state-owned land on Drummond Island where a projected test has been shut down with 80 feet of drive in the hole for many months. This is the F. D. Barton and others' No. 1 Kreetan company, SW NW SW section 17-41n-7e, Drummond Township, Chippewa County. In addition Mr. Packer bid $105 for 6,730 acres in Arenac County, northeastern Michigan.

A total of 50,179 acres were offered and mineral rights on 16,225 acres were sold. Although one of the largest offerings, most of the property was in wildcat territory with bids aggregating only $1,337 or 8.2 cents per acre. Tracts on which oil and gas rights were sold included state lands in Ogemaw, Wexford, Missaukee, Osceola, Alpena, Arenac and Roscommon Counties.

Pipe Line Tax Case

DALLAS, Tex., Nov. 11.—Judge William H. Atwell ruled in federal court that Brown County cannot collect an intangible assets tax from the Atlantic Pipe Line Co. His ruling was made on the application of the pipe line company to make permanent a temporary injunction against collection of the tax. The temporary injunction was issued by Judge Atwell last spring.

He held that the tax should not be paid because evidence showed that other individuals and corporations in Brown County had not been assessed on their intangible assets; hence the assessment against the Atlantic company was discriminatory.

Assistant Attorney General Grady Chandler, representing the state tax board, gave notice of appeal.

Michigan Permits

MUSKEGON, Mich., Nov. 11.—Eleven other new permits were issued for tests in Greendale, Jasper and Porter Townships, Midland County; Millbrook and Hinton Townships, Mecosta County; Belvidere Township, Montcalm County, and Denver Township, Isabella County. A transfer also was granted for a new location in Crystal Township, Montcalm County. All are in proved territories.

Refinery Inspected

SARNIA, Ontario, Nov. 9.—The federal tariff board, headed by Chairman George H. Sedgewick, this week inspected the Imperial Oil, Ltd., refinery here in connection with its inquiry into the gasoline tariff.

Copies of "Petroleum—Twenty-five Years Retrospect" published by The Institution of Petroleum Technologists, London, are held by the Engineers Book Shop, 168 East 46 Street, New York, from whom they can be obtained at $2.80 per copy.

PERSONAL

H. M. (JACK) STEIG, in the exploration department with the Shell Petroleum Corporation at Houston, Tex., made an inspection trip through Coastal Louisiana the past week.

HERMAN A. FONVILLE, consulting geologist of Wichita Falls, Tex., has unearthed a fossil head at the junction of the Wichita, Brazos and Pease Rivers, 20 miles west of Seymour in Baylor and Knox counties, Tex. Bones of prehistoric elephants, turtles, horses and dogs were also found in the beds.

L. A. (PETE) LITTLE, chief engineer for the Lufkin Foundry & Machine Company, has been transferred from Lufkin to Dallas, Tex., and WALTER TROUT, who has been at Dallas, has been transferred to Lufkin and made assistant to his father who is president of the company. E. N. SPIARS, representative for the company at Henderson in East Texas, has been transferred to Midland to cover the West Texas district.

C. W. HANLEY, zone agent for the Gulf Production Company, Fort Worth, Tex., was reelected a regional director of the Texas Archeological Society at its annual meeting at Abilene.

W. S. HALLANAN, president, and the board of directors of the Plymouth Oil Company recently returned East after an extensive inspection tour of that company's properties in Texas. The group including PAUL BENEDUM, H. B. DAVENPORT, WALTER JONES, J. D. FARQUHAR, W. E. HUSTON, W. M. HENDERSON and DAVID JOHNSON, were in Sinton last week visiting the Plymouth field in San Patricio County under the guidance of Vice President C. E. BYERS of San Antonio, later going to Texas City, to inspect the plant of the subsidiary Republic Oil & Refining Company. The trip was completed by a visit to the Big Lake production of the company in West Texas. All are residents of Pittsburgh excepting Mr. Hallanan and Mr. Davenport, whose homes are in Charleston, W. Va.

A. C. RUBEL, manager of field operations of the Union Oil Company of California, was master of ceremonies at the home talent show presented in Glendale, Calif., recently by the Union Oil Girls Club to raise money for the Christmas baskets which the women of the company present to those less fortunate at Christmas. A. C. (CY) RUBEL is chairman of the program committee, Drilling and Production, California Division, and as such has been quite busy during the A.P.I. convention.

C. S. WORLEY and S. F. SHAW are building two additional gas-lift plants for the Westgate-Natural Gas Development Company interests on the Cary lease in the Oklahoma City field.

A. M. GEE, general counsel for the Ohio Oil Company of Findlay, Ohio, was in Casper, Wyo., visiting headquarters for the western division of the company. He joined WILLIAM McFAYDEN and DR. W. B. EMERY en route to the A.P.I. meeting at Los Angeles, Calif.

GEORGE W. RAWLINGS has returned to Chatham, Ontario, from a business trip to Toronto.

W. MORGAN DEAN of Detroit, Mich., recently inspected the Dover and Raleigh fields in Kent County, Ontario.

GLEN M. RUBY, president of Nordon Oil Corporation, of Los Angeles, visited Lethbridge and other southern Alberta points recently.

C. E. DUFFIELD, independent operator and dog fancier of Dallas, Tex., attended the Southwest Field Trials with his dogs in Oklahoma.

DR. H. A. IRELAND of Tulsa, addressed the Fort Worth Geological Society recently on "The Use of Insoluble Residues for Purposes of Correlation."

CLARE STOVER of the contracting firm of F. H. Stover & Son of Chatham, Ontario, has left the hospital after eight weeks' treatment for injuries received while drilling in the Dover field.

FRANK CHAMPION, general sales manager for the oil tool division of Byron Jackson Company, has returned to Los Angeles after a tour of 10 weeks in the Mid-Continent and a visit to New York.

D'ARCY M. CASHIN, consulting geologist of Houston, Tex., has returned from an extensive motor trip through the United States and Canadian national parks. He and MRS. CASHIN were away two months and traveled 8,000 miles.

R. OGARRIO, vice president of the Texas Corporation, New York, and R. F. BAKER, chief geologist of the company, in the same city, were business visitors in Fort Worth, Tex., last week. They were accompanied by FRED C. BEALEY, Houston, manager of the South Texas division.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Oklahoma and Kansas crude oil is advanced in price to 42 cents per barrel, a 2-cent increase.

Tim Spellacy, oil man and Democrat, was defeated for lieutenant governor of California by 20,000 votes. He was defeated because many Democrats voted the Socialist ticket.

Midway Premier Oil Company gets a 40,000-barrel well in the Midway field, California.

20 YEARS AGO

The city of Tulsa got its name from a Creek Indian word meaning clan. Its original name was Tulsa-Lochapoka, or so an Indian authority informs The Oil and Gas Journal.

After years of waiting Oklahoma, Kansas and North Texas producers are getting $1 per barrel for their crude. Cushing, Healdton and Glenn pools and the southeastern Illinois fields kept the price down for the past eight years.

Eastern automobile owners fear a shortage of motor fuel and it is predicted that gasoline will go to 50 cents per gallon. These pessimists are afraid the oil business cannot keep pace with the rapid growth of sales of motor cars.

Producers Oil Company gets a 15,000-barrel well in the Humble field, Texas. It is No. 17 Stevenson.

10 YEARS AGO

George H. Jones, vice president and treasurer of the Standard Oil Company of New Jersey, has been chosen to succeed the late A. C. Bedford as chairman of the board of directors of the company.

Prairie Pipe Line Company buys a half interest in the Pure Oil Company's pipe line which runs from the Mexia field to a point on the Neches River below Beaumont, Tex. It gives the Prairie a Gulf port outlet.

Central Railroad of New Jersey adopts oil-electric locomotives for use in its suburban service, regarded as a great step forward in railroading.

Yount Lee Oil Company uncovers deep sand oil production in the Spindletop pool, Texas.

CARL ESTES, Longview, Tex., is seriously ill at his country home near Mineola, Tex.

M. W. CLARK, independent operator of Wichita Falls, Tex., has returned from a trip to New York.

MERLE F. GUNBY, independent operator of Laredo, Tex., has moved to Fort Worth, Tex., with his family.

B. B. GREGORY has been made chief clerk and warehouseman for the Humble Oil and Refining Company at Pampa, Tex.

ROSS ALLEN, vice president of the Cabot Company and manager for the company in the Panhandle of Texas, was married on October 30.

W. S. S. RODGERS, president of the Texas Company with headquarters in New York, visited the company's offices at Houston, Tex., the past week.

DR. R. R. MORSE, head of the geological department for the Shell Petroleum Corporation, made a tour of inspection through coastal Louisiana and West Texas last week.

FRED TURNER, president of the Turner Oil Corporation, Mount Pleasant, Mich., visited Dallas, Tex., last week. He was formerly in the land department of the Shell Petroleum Corporation in Dallas.

PAUL R. MARTIN, chief scout for the Pure Oil Company, and F. WELDON BRIGANCE, of the Rowan Drilling Company, both of Fort Worth, Tex., and their families are spending a vacation in California.

DR. LLOYD A. NELSON, associate professor of geology at the Texas School of Mines, addressed the Rocky Mountain Association of Petroleum Geologists at Denver, Colo., on "Studies of the Carboniferous of the Franklin Mountains of Texas."

PARAGRAPHS

J. A. FAWCETT, who was recently added to the field staff of the Pennsylvania Grade Crude Oil Association, has returned to the Oil City, Pa., headquarters from a speaking tour in western New York. Mr. Fawcett went to the association from the Crystal Oil Works, at Rouseville, Pa., pioneer refinery owned by his grandfather, MAJ. JAMES FAWCETT. He reports aggressive interest in the organization in the Empire State.

EMIL DUCOMMUN, president of the Ducommun Company, has returned to Los Angeles, Calif., following a three weeks' vacation cruise through the Panama Canal aboard the steamship Virginia.

W. C. DUNBAR has been appointed terminal superintendent of the Petrol Corporation's marine terminal at Los Angeles harbor and has his office in a new all-steel building which houses all master switches for controlling the various pumping units. Mr. Dunbar was formerly marine superintendent for the Monarch Refining Company at Long Beach.

J. S. BOLDRICK, district petroleum engineer for Humble Oil & Refining Company, has been transferred from the Thompson, Texas, district to the Tomball district.

MR. and MRS. KING HOUSTON, who have been spending two months in London, Petrolia and other Ontario points, sailed from New York on November 9 for Negritos, Peru, where Mr. Houston is in the production department of International Petroleum Company.

C. W. BENNETT, president and general manager, J. W. BATTEN, his assistant, both with the Detroit City Gas Company, B. R. BAY, president of the Panhandle Eastern Pipe Line Company, and J. D. REINBOLD of the same company, have been making an inspection of the company's line in Texas and the Mid-Continent. R. D. FIELD, representative of the company at Amarillo, Tex., met the party at Liberal, Kans.

M. S. BIGGS, in the purchasing department of the Stanolind Oil and Gas Company, Houston, Tex., was recently married to MISS HAZEL CALDWELL of Fort Worth, Tex.

J. W. WINFREY, district petroleum engineer for the Humble Oil & Refining Company and formerly located in the Tomball, Texas, district, has been transferred to the division offices at Houston, Tex., as assistant division petroleum engineer.

OLE BERG of the Union Oil Company, who entered the employ of the company as an office boy in the San Francisco office in 1921, has been appointed division sales manager of the Oregon territory in the northern division. Heretofore the company's northern division sales territory has included Oregon, Washington and Idaho, but sales activity during the past year has necessitated an additional control point at Portland, where Mr. Berg will make his future headquarters.

M. C. LUCKY, of Houston, was in the Rio Grande valley at McAllen, Tex., recently.

J. D. COLLETT, independent operator of Fort Worth, Tex., and MRS. COLLETT, are visiting California.

OLIVER B. HOPKINS, geologist of Imperial Oil, Ltd., arrived in Calgary, Alberta, recently from Toronto, Ont.

T. E. SWIGART, vice president for the Shell Petroleum Corporation at Houston, Tex., left last week for California.

H. L. SCOTT, geologist, of Tulsa, has arrived in Denver, Colo., to make his headquarters with Manning & Terry, Inc.

C. J. HOFFMAN, with the Southland Royalty Company at Fort Worth, Tex., was a business visitor to Houston, Tex., the past week.

DR. VIRGIL R. D. KIRKHAM, of Saginaw, geologist and vice president of the Oil and Gas Association of Michigan, is visiting California.

ROY S. DODD, with the Volcano Burner Company of Houston, Tex., has returned to his desk after spending several weeks in California on business.

HARRY HELLER, advertising manager for the Reed Roller Bit Company, at Houston, Tex., is on an extended business trip through the Mid-Continent area.

C. F. MARTIN, sales representative of the Rio Grande Oil Company in the Oakland, Calif., district, has been appointed district sales supervisor of the Fresno district.

FRED MANNING, of Manning & Terry, Inc., contract drillers, left Denver, Colo., for an inspection of work in progress in the Lance Creek field in Wyoming and at Cut Bank, in Montana.

Opened a Big Oil Pool

While practicing law in Dallas, Tex., as a youthful graduate of the Yale law school in 1911, Charles W. Teater, now a leading independent operator in Michigan, acquired his first interest in the oil business. Eventually he was to discover the Porter Township Pool, the biggest yet developed in Michigan. During the intervening years he served as a lieutenant in the World War and then spent several years selling real estate in Chicago. Eventually a wildcatter and soldier of fortune, he migrated to Miami, Fla., during the boom of 1925 and operated in real estate.

CHARLES W. TEATER

When the Florida bubble burst young Teater turned to the oil industry, operating in Kentucky, Louisiana and Texas. Going to Michigan in 1929, he drilled two wildcats, one in Oceana County, the other in Midland County, and both dry holes.

Four months later with the Michigan Pacific Oil & Gas Company, a New York concern, he started another test in Porter Township, Midland County. On February 24, 1933, it came in making 3,207 barrels initial in the Dundee and opening Michigan's greatest field which on July 1, 1934, had an estimated daily potential of 180,000 barrels, the state's all-time record during the first decade of its oil history.

Recently Mr. Teater returned to Newaygo County, where he had gathered up a block of about 6,000 acres in Brooks, Everett and Garfield Townships. He is now testing this area.

Mr. Teater's hobbies are dogs, hunting and drilling wildcat wells. He is a native of Iowa and received his undergraduate education at Drake University, Des Moines. He and Mrs. Teater reside in Saginaw, Mich.

FLOYD WATERFIELD, of the Oklahoma Pipe Line Company, Tulsa, returned to the office after an illness.

F. O. Young, manager of sales of the National Tube Company, St. Louis, Mo., was a visitor in Tulsa.

G. C. MILLER, vice president of the British American Oil Company, Toronto, Canada, visited Tulsa last week.

MISS M. V. CROSBY, in the scouting section for Shell Petroleum Corporation at Houston, Tex., is spending her vacation in Dallas, Tex.

N. F. HENDERSON, with the Humble Oil & Refining Company at Houston, Tex., has been transferred to Darrow, La., as district petroleum engineer.

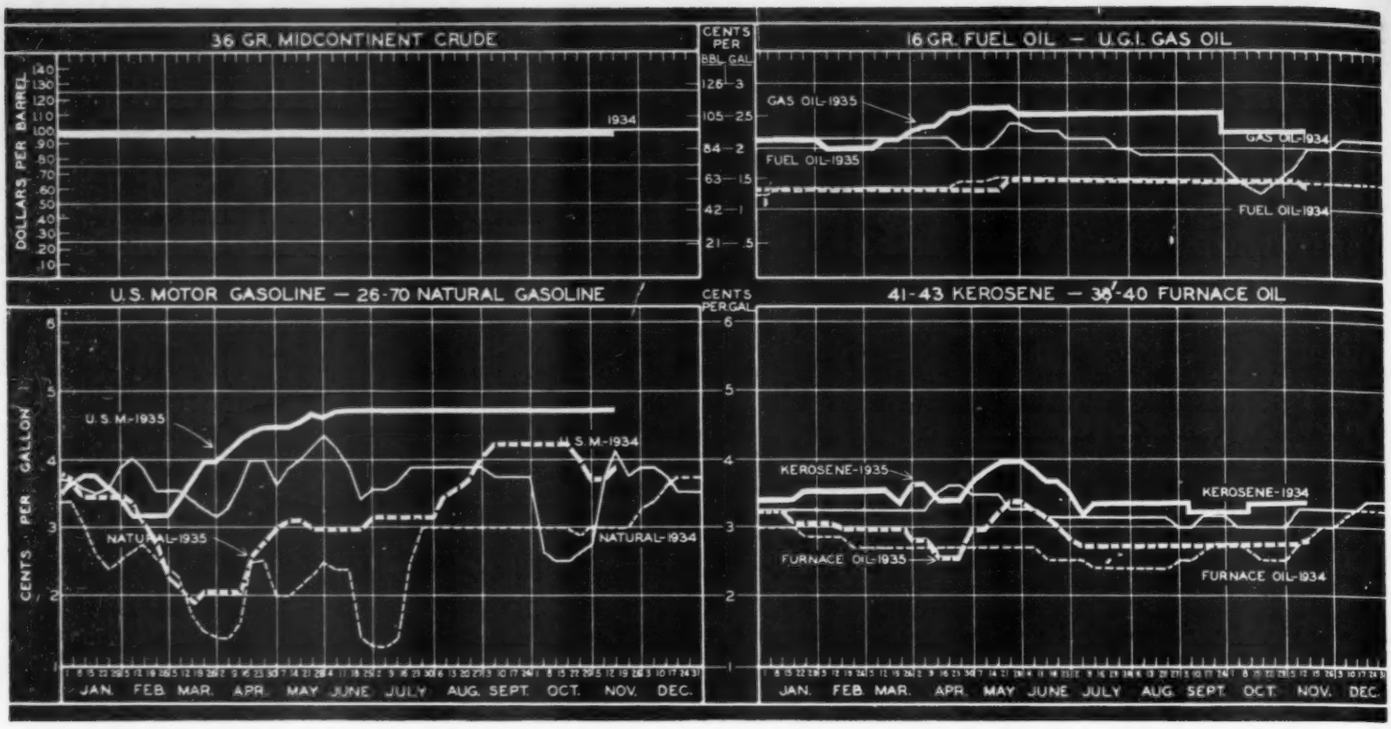
F. F. WRIGHT, who has been in the Burbank-Shidler, Oklahoma, district for Sinclair Prairie Oil Company, has been transferred to Sedan, in southern Kansas.

MARSHALL BAUMAN, Crystal and Porter field operator in central Michigan, has recovered from serious injuries suffered in an automobile accident a few weeks ago.

I. W. ALCORN, formerly sales engineer for the Oil Well Supply Company, has been made division engineer of the Gulf Coast division of Pure Oil Company at Houston.

WALTER FLEMMING, president of the Marathon Oil Company, and FRANK CLARK, chief geologist, are in Mexico looking over the properties of the Ohio & Mexico Oil Company.

E. A. KEELER, in the geological department of the Midland-West Texas office of Phillips Petroleum Company, has been transferred to the Breckenridge-Central West Texas department. He is succeeded by Joseph Pursor, who has been in the Oklahoma City division office.



East Texas Area Regarded as Holding Key to Gasoline Market in Group 3

By T. F. SMILEY

As the tank car gasoline market moves into the winter season eyes are turning toward East Texas as probably holding the key to the welfare of Oklahoma (Group 3) refiners for the next four or five months. For that matter, the welfare of refiners in most districts east of the Rockies. Transportation and marketing facilities have become so highly organized and interlaced that flagrant overproduction in any one spot can become a menace to the whole market structure.

No Cause for Alarm Right Now

At the present moment the situation in East Texas is nothing to stir alarm. Unwieldly stocks reported there in the early days of the month have been absorbed, and observers say they see no reason to expect trouble to appear throughout the rest of November. Cooperation among Mid-Continent refiners and willingness of large eastern refiners to take over surplus stocks of legally produced East Texas gasoline have preserved a steady and profitable market since last spring. Whether the sane give-and-take program which has produced such gratifying results in the Mid-Continent can be carried through the low-consumption months of December, January, February and March depends upon whether all the refiners affected are farsighted enough to see that a course which operates for the common good brings bigger returns in the long run than greedy zeal for individual (and merely temporary) profits.

In the evolution which marketing methods are undergoing—and the marketing division is experiencing change just as are all other branches of the oil industry—something is happening to brokers. Among the relatively few wails evoked by methods which have stabilized gasoline prices at profitable levels in the Mid-Continent since last May the shrillest and most anguished have been emitted by a certain type of brokers. These complain that the spot market, in which they once reaped handsome harvests, is becoming a rough and barren area.

Perhaps it is. For them.

Inquiry discloses evidence, however, that few brokers who have adhered to high standards of business are in distress. It is true that the last year has witnessed contraction of spot gasoline business, with corresponding expansion of contract movement. That is something which affects brokers. But the brokers who really have suffered loss of business, observers say, are for the most part those who have been guilty of loose office methods, unethical practices or plain trickery. These are the ones who, in the weeding-out process which now seems to be under way, are seeing business slip away from them,

Refinery sales managers unhesitatingly concede brokers have performed valuable service by creating an active market and exerting a stabilizing influence on it, and they assert the market of the future will hold a place for the business-like, straight-shooting broker.

Refined Oil Market Barometer

A stronger undertone was evident in the tank-car gasoline market this week, with price advances in several areas. Some weak spots in the retail division need correction. Feeling is general that the oil industry faces a good year if it profits by lessons learned in 1935. Exchange of ideas among leaders at the A.P.I. convention in Los Angeles is expected to prove beneficial.

MID-CONTINENT. Gasoline steady, naturals up, lubricants firm, heavy fuels soft, wax strong.

EAST COAST. Gasoline tankcar prices advance. Other products in better position.

GULF COAST. Market generally steady, with good undertone.

PENNSYLVANIA. Gasoline, kerosene and wax up. Entire list strong.

CALIFORNIA. Gasoline up and general trend toward firmer ground.

CHICAGO. Gasoline steady on generally good oil market sentiment.

Naturals in Better Position

Natural gasoline is in distinctly better position than it was prior to the recent trimming of prices, and the 26-70 grade was up an eighth in both Oklahoma and Texas as the result of difficulty encountered by spot buyers in getting material for immediate shipment. Buyers on contract were asking that shipments be speeded up. Though stocks at terminals and refineries were reported adequate, those at plants were low. Much of the casinghead material now being blended with the refined product for winter motor fuel was bought by refiners last spring and summer, when prices were at a lower level. The result is a toning down of the fall and early winter demand, with the advantage, however, of smoothing out the business for the year.

Demand for 18-pound material was reported as negligible and little of that grade was being made. Virtually all plants were turning out 26- and 22-pound only.

Neutrals and bright stocks were strong at unchanged prices, with inventories low. Little wax was available, and quotations were firm. Kerosene was displaying softness in spots, and a few refiners who found themselves with more than they needed were reported to have shaded quotations. The furnace oils showed little change. colder weather in northern consuming points being required to give them increased life. Industrial fuel oils were dragging.

Advances in Fuel, Gas and Furnace Oil Expected in the East Coast Market

By C. O. WILLSON

NEW YORK, Nov. 11.—Posted tank car gasoline prices which have been unchanged for several months were generally advanced in this territory the latter part of last week. The price increase of one-fourth cent was first inaugurated in New York and New England by Socony-Vacuum Oil Co. Inc., and then followed by the Standard Oil Co. of New Jersey and other major refiners in New Jersey. The new prices in New York harbor area for tank-car shipment are 6¼ cents for middle octane, 6½ cents for 65 octane and above and a minimum of 6¾ cents for the regular branded grades of gasoline containing Ethyl fluid. While not generally quoted the prevailing price on U. S. Motor material under 60 octane was 6 cents. For barge shipments most refiners and water terminal operators quoted one-fourth cent under the tank car schedules. The same one-fourth-cent advance was made at most of the other tank-car distributing points in this territory.

There were no significant changes reported in prices on other products. Many of the trade were confident that fuel oil, gas oil and furnace oil prices at refineries will be advanced in the near future. In the case of these products the higher tanker rates on shipments from the Gulf Coast are a factor. It was reported that since the first of the month shippers of heavy fuels have paid as high as 30 and 32 cents per barrel for tankers. This represents an increase of 10 cents per barrel over recent rates. It is pointed out that bunker fuel at the Gulf is now generally quoted at 70 cents, which means with a 30-cent transportation charge a delivered cost of $1 per barrel. The present price for Bunker C to the marine trade, not including lighterage charge, is 95 cents par barrel. Largely the same situation obtains in the case of gas oil and furnace oils. The latter were advanced one-eighth to one-fourth-cent 10 days ago. While less than one-half of the heavy fuels and overhead distillates and gas oils consumed in this territory come from the Gulf Coast, the latter market is the controlling factor and not imports as is sometimes contended.

Aside from the increased transportation costs the demand for fuels is showing a seasonal increase and many market observers familiar with conditions are predicting substantially higher levels by early winter. The temperatures in this territory have been exceptionally high so far this fall and this situation has been particularly apparent in the consumer demand for furnace oils. It is felt that the first extended cold spell will show that supplies are not so large as they have appeared to be for several months. This fact coupled with a general tightening in all oil markets is the basis for the feeling that fuel prices are headed for higher levels. Last fall Bunker C fuel was quoted at $1.20 per barrel in New York harbor. Prices slumped the latter part of last year and the fore part of this year due to the increased supplies at the Gulf coupled with competitive conditions in foreign markets brought about by the entry of Iraq crude oil in European refinery operations.

In line with the general feeling regarding conditions in the oil business and the outlook for the coming year, it is also predicted that prices on some of the other products of the refinery list will advance. This includes steam-refined stocks, bright stocks and neutral oils among the lubricants and all grades of wax. The wax situation has improved in recent weeks with an increased demand and there has been a gradual strengthening in crude-scale grades. Additional increases in all these products are needed, it is said, to bring a return to profitable levels.

Should gasoline prices at the Gulf advance as predicted, reflecting in part an improved situation in the Mid-Continent, the tank-car schedules in this territory probably will be advanced again. It is claimed in this connection that the tank-car schedules in this territory have never been high enough in relation to crude prices and transportation costs since the $1-base schedules were established for crude oil over two years ago. It is said that 7 cents for 65-octane plus white gasoline would be in line at this time with higher prices justified, should Mid-Continent crude schedules be advanced as is now being predicted. The trade opinion seems to be that for the present at least retail and posted dealer prices on gasoline will be unchanged except at subnormal points in order that the wide spread between tank car and station prices can be narrowed.

Stocks of gas oil and distillate and residual fuel oils at the end of September were less than on the same date in 1934. Stock increases in these products in September were small. The statistical situation of these products is improving in this territory and with the heavy winter demand for fuel oils, the surplus situation of last spring and summer should end. Eastern refiners pulled on their stocks of both refined and crude-scale wax and stocks of the refined grades are substantially lower than they were a year ago. Crude scale prices have recently strengthened. Eastern refiners as a group entered October in a better operating position than existed a year ago. Total stocks are approximately the same but the demand for most products is running from 5 to 10 per cent ahead of last year so that inventories based on days' supplies are less.

Prices

Export prices at the Gulf are steady. Spot inquiries have declined but shipments on previous sales and the regular contract movement continues heavy. A check made by one buyer last week found practically all of the independent sources of supply sold up with no prospects that this situation would change materially over the balance of the year. The larger companies have material on hand in two or three cases but apparently are not anxious to take on additional business at this time. The 64-66, 375 grade is quoted at 5⅜ to 5½ cents with prices down to 5⅛ cents for U. S. Motor. The kerosene market is inactive but prices on 41-43 water white at the Gulf are steady at 4 cents with 3⅞ cents for the prime white. The crude market at the Gulf continues tight with inquiries for both coastwise and export movement.

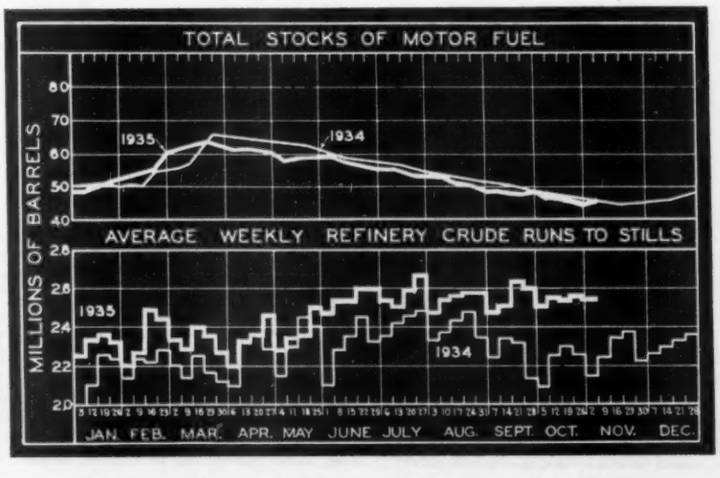
Quotations on furnace oils range from 3¾ cents for No. 4 to 5 cents for No. 1, including range oil. Barge prices are one-eighth to one-fourth-cent lower. The same price is quoted for kerosene. Diesel fuel is $1.65 to the marine trade. Steam-refined prices are unchanged with bright stock considered strong at 26½ cents (No. 8 Pennsylvania grade) in barrels. Crude-scale prices are strong at a low of 2.20 cents per pound with prices ranging up to 2.32 cents.

A. P. I. Weekly Refinery Statistics

Week Ending November 2, 1935

	Capacity reporting per cent	Daily crude runs (bbls.)	Total gasoline (bbls.)	Gas oil and fuel oil (bbls.)
East Coast	100.0	498,000	12,584,000	12,767,000
Appalachian	94.8	98,000	2,054,000	927,000
Indiana, Illinois, Kentucky	95.9	384,000	8,087,000	4,274,000
Oklahoma, Kansas, Missouri	84.8	229,000	4,576,000	4,812,000
Inland Texas	48.5	92,000	1,218,000	1,603,000
Texas Gulf	96.4	520,000	6,419,000	11,357,000
Louisiana Gulf	96.4	119,000	1,141,000	4,804,000
North Louisiana and Arkansas	90.0	42,000	268,000	504,000
Rocky Mountains	61.9	37,000	705,000	803,000
California	92.6	529,000	9,469,000	66,590,000
Total United States	89.5	2,548,000	46,521,000	108,441,000
Stocks (barrels)—			Nov. 2, 1935	Nov. 3, 1934
Finished gasoline			41,358,000	41,535,000
Unfinished gasoline			5,163,000	4,825,000

NOTE: In addition to above there are stocks classified as "Stocks of Other Motor Fuel." These stocks total around 5,500,000 bbls. but show only minor changes and are not included in this weekly summary.



Protest Chain Store Tax

DENVER, Colo., Nov. 11.—Standard Oil Co. (Indiana) and Continental Oil Co., have filed suits in the district court at Denver to restrain Colorado officials from collecting $23,528 from Standard and $44,563 from Continental under the Colorado chain store tax which went into effect January 1, 1935. Continental owns 162 stations and Standard 92 stations in the state, but these have been operated by lessees prior to the new law going into effect. The plaintiffs allege the filling stations are not stores and that the law does not apply where the stations are operated by lessees.

PRICES ON REFINED PRODUCTS

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of November 12, 1935

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
Below 63 octane	.04¾	.04¾
63-70 octane	.05¾	.05¾
60-62 400 grade:		
Below 63 octane	.04¾	.04¾
63-70 octane	.05¾	.05¾
64-66 375	.04¾	.05
68-70 360	.05	.05½

NORTH TEXAS—

U. S. Motor grades:		
Below 63 octane	.04¾	
63-70 octane	.05¾	
60-62 400	.04¾	.04¾
64-66 375	.04¾	.05

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U. S. Motor grades:	
Below 63 octane	.05½
63-70 octane	.06¼
60-62 400	.05½

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:	
Below 63 octane	.05½
63-70 octane	.06¼

CHICAGO (based on Group 3)—

U. S. Motor grades:		
Below 63 octane	.04¾	.04¾
63-70 octane	.05¾	.05¾
60-62 400	.04¾	.04¾
64-66 375	.04¾	.05
68-70 360	.05	.05½
Aviation fighting grade	.05¾	.06

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:	
Below 60 octane	.05½
60-64.9 octane	.06¾
65-70 octane	.07
64-66 375	.05¾
68-70 350	.05¾

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.05	.06
58-60 400	.05¾	.06½

EAST COAST—

U. S. Motor, below 60 octane:		
*New York (Bayonne)	.06	.06¼
Baltimore		.05¾
U. S. Motor, 60-64.9 octane:		
*New York (Bayonne)		.06½
Philadelphia		.06
Boston		.06
Baltimore		.06
Charleston, S. C.		.06
U. S. Motor, 65 and above:		
*New York (Bayonne)	.06½	.06¾
Philadelphia		.06¼
Boston		.06½
Baltimore		.06¼
Charleston, S. C.		.06¼

*All grades of gasoline one-fourth cent less for small barge shipments.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane		.05
60-64.9 octane	.05½	.05½
65 octane and higher		.05½

Naphtha

PENNSYLVANIA (inland refineries)—

50-52 450 (blending)	.05½
52-54 450 (blending)	.05½
54-56 450 (blending)	.05¼

CHICAGO (based on Group 3)—

50-52 450 (blending)	.04¾	.05
Cleaners' naphtha, 56-58 gr., 200 i.b.p., 20 e.p.	.06¾	.07
Lacquer diluent, 190 i.b.p., 250 e.p.	.07¾	.08
Lacquer diluent, 68-70 gr., 200 e.p.	.08¾	.09
Rubber solvent, 68-70 gr., 190 i.b.p., 300 e.p.	.06¾	.07
Stoddard solvent, 300 i.b.p., 410 e.p., over 33° flash	.06¾	.06½
Pet. thinner, 200-300 i.b.p., 410 e.p., over 33° flash	.06¾	.06½
V.M.&P. naphtha, 56-58 gr., 190-200 i.b.p., 250° e.p.	.06¾	.07
Petroleum spirits	.05¾	.06

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70	.03¾	.04
Grade 18-55	.04¾	.04¾
Low vapor pressure grade:		
*14 lb. v.p. (max.)	.05¼	.05¾
*12 lb. v.p. (max.)	.05¼	.05¾

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70	.05¼

NORTH TEXAS—

Grade 26-70	.03¾	.03¾
Grade 18-55	.04¾	.04¾
*14 lb. v.p. (max.)	.04¾	.05¼
*12 lb. v.p. (max.)	.05¼	.05½

CALIFORNIA—

75-85 375-390	.04½	.05½

*Nominal.

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.03¾	.03½
42-44	.03½	.03¾

NORTH TEXAS—

41-43	.03¼	.03½

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.03¾

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04¼

PENNSYLVANIA (inland refineries)—

45	.04¾
46	.04¾
47	.05

CHICAGO (based on Group 3)—

41-43	.03¾	.03½
42-44	.03½	.03¾

CALIFORNIA (Pac. Coast market)—

38-40 high burning test	.04¾	.05

NEW YORK (Bayonne, N. J.)—

*41-43	.05

GULF COAST (domestic)—

41-43	.04¼	.04½

*Barge price one-eighth cent lower.

Petroleum Coke

(Prices per ton f.o.b. Chicago area. Refineries absorb freight to 80 cents a ton.)

Pile run	6.25
Direct from still	7.25
Egg, nut, pea	8.00
Lump	8.75

Furnace Oil

OKLAHOMA (Group 3)—

No. 1 prime white, 38-42	.03¼	.03⅜
No. 1 straw, 38-40	.03	.03⅛
No. 2 straw, 32-36	.02⅝	.03⅛
No. 2 dark, 32-36	.02⅝	.03
No. 3, 28-32	.02⅜	.02⅝
No. 3, 15 and above, 28-32	.02½	.02⅝

NORTH TEXAS—

No. 1 prime white, 38-42	.03¼	.03⅜
No. 1 straw, 38-40	.03	.03⅛

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03⅛	.03⅛

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36		.03⅛
No. 3, 28-32		.03¼

CHICAGO (based on Group 3)—

No. 1 prime white, 38-40	.03⅛	.03¼
No. 1 straw, 38-40	.03	.03⅛
No. 2 straw, 32-36	.02⅝	.03
No. 2 dark, 32-36	.02⅝	.02⅞
No. 3, zero to 15, 28-32	.02⅝	.02⅞
No. 3, 15 and above, 28-32	.02½	.02½

NEW YORK (Bayonne, N. J.)—

*No. 1	.04¾	.05
*No. 2		.04
*No. 4		.03¾

*Barge deliveries one-eighth cent under above tank car price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02¼	.02⅜
No. 4, 24-28	.87½	.90
No. 4, 15 and above, 24-28	.75	.80
No. 5	.70	.75
No. 6	.65	.67½
Below 15 fuel oil, industrial	.60	.65

NORTH TEXAS—

U.G.I. gas oil	.02¼	.02¼
No. 4, 24-28	.87½	.90
No. 5	.70	.75
No. 6	.65	.67½
Below 15 fuel oil, industrial	.60	.65

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U.G.I. gas oil	.02⅝	.03
10-14 fuel oil, industrial	.75	.80

ARKANSAS (Ark., N. La., Miss. del.)—

10-14 fuel oil, industrial	.60	.65

CHICAGO (based on Group 3)—

U.G.I. gas oil	.02¼	.02⅜
No. 4, 24-28	.87½	.90
No. 4, 15 and above, 24-28	.72½	.77½
No. 5, 18-22	.62½	.65
No. 6, 10-16	.52½	.55

Fuel oils of more than 40 cold test generally 5 to 15 cents per bbl. in these areas.

PENNSYLVANIA (inland refineries)—

36-40	.04¾	.04¼

CALIFORNIA—

Los Angeles:

30-34 gas oil, per bbl.	1.05	1.25
27 plus Diesel	1.05	1.25
27 plus Diesel (bunkers)	1.25	1.30
12-16 (bunkers at tidewater)	.87	.95
10-16 (cargo lots)	.75	.92½
12-17 (tank cars)	.65	.95
San Joaquin Valley:		
10-18 (tank cars)	.60	.75
San Francisco:		
27 plus Diesel, per bbl.		1.25
27 plus Diesel (bunkers)		1.35
10-16 (bunkers)		1.00

GULF COAST—

28-30 gas oil		.03½
28-30 Diesel (bunkers)		1.70
Bunker C (bulk cargoes)		.70
Bunker C (bunkers)		.80

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04
28-30 Diesel (lighterage 6½ plus per bbl.)		1.65
28-30 Diesel (tank cars)		.04
*Bunker C (to ocean-going ships in N. Y. harbor)		.95
Industrial fuel (tank cars)		.03¾

*Lighterage charge 5c bbl. additional.

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.P.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:

150-3	.10
180-3	.11¼
180-4	.10¾
200-3	.11¾
200-4	.11¼
240-3	.13¾
240-4	.13¼
280-3	.14¾
280-4	.14
300-3½	.15¼
400-3½	.16
100-2 paraffin oil	.05¾

15-20 Cold Test:

200-3	.10¾
200-4	.10¼
240-3	.12¾
240-4	.12¼
280-3	.13¾
280-4	.13

GULF COAST—

Pale Oils:

200-3	.07	.07½
300-3	.07½	.08
500-3½	.08½	.09
750-3½	.09	.09½
1,200-3½	.09½	.09¾
2,000-4	.09¾	.10

Red Oils:

200-5-6	.07	.07¼
300-5-6	.07¼	.07½
500-5-6	.08	.08½
750	.08½	.09
1,200-5-6	.09¼	.09½

CALIFORNIA (moving to dom. market)

Pale Oils:

100-2½-3	.07	.07¼
200-2½-3	.07½	.07¾
300-3-3½	.08	.08½
350-3-4	.09	.09¼
400-3-4	.09½	.09¾
450-3-4	.10	.10¼
550-3-4	.10¼	.10¾
600-3-4	.10½	.10¾

Red Oils:

200-4-5	.07	.07¼
300-5-6	.07½	.07¾
350-5-6	.08¼	.08¾
400-5-6	.09	.09¼
450-5-6	.09¼	.09½
500-5-6	.09½	.09¾
600-5-6½	.10	.10½
700-6½ plus	.10¼	.10½
750-6½ plus	.10½	.10¾
900-6½ plus	.10¾	.11

PENNSYLVANIA—

150 vis. at 70° F., color, 400-405 flash:		
Zero pour test	.21	.21½
10 pour test	.20	.20½
15 pour test	.19½	.20
25 pour test	.18½	.19
180 vis. at 70° F., 3 color:		
25 pour test	.21	.21½
200 vis. at 70° F., 3 color:		
Zero pour test	.25½	.26
10 pour test	.24½	.25
15 pour test	.24	.24½
25 pour test	.23	.23½

Bright and Steam Refined

OKLAHOMA (Group 3)—

Bright Stocks:		
190-200 D, 15-25		.20
150-160 D, 0-10		.17
150-160 D, 15-25		.16½
150-160 E, 15-25		.16
100-110 D, 0-10		.15¾
Steam refined:		
630 green (treated)		.09½
600 light green, untreated		.08½
600 dark green, untreated	.05	.06

PENNSYLVANIA—

Bright Stocks (Pennsylvania grade, No. 8 color, 145-50 at 510; 540-550 flash):

10 pour test	.22	.22½
15 pour test	.21	.21½
20 pour test	.20	.20½
25 pour test	.19	.19½
Steam refined:		
600	.09½	.10
650	.11	.11½
600 Pennsylvania flash	.12	.12½
630 flash	.17	.17½
600 Warren E filtered	.13	.13½

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02¼	.02½

PENNSYLVANIA (inland refineries)—

122-124 (a.m.p.) w.c. scale	.0235	.0240
124-126 (a.m.p.) w.c. scale	.0235	.0240

NEW YORK—

Wax in bags fully refined:

123-125 (a.m.p.) wax		.0420
125-127 (a.m.p.) wax		.0430
128-130 (a.m.p.) wax		.0455
130-132 (a.m.p.) wax		.0480
133-135 (a.m.p.) wax		.0510
136-137 (a.m.p.) wax		.0565
124-126 (a.m.p.) w.s.		.0225
124-126 (a.m.p.) y.s.	.0220	.0225

Petrolatum in barrels, carload lots:

Dark green		.01¾
Amber	.02¾	.03
Extra amber	.03	.03¼
Lily white	.06¾	.06¾
Snow white	.07¾	.07¾
Cream	.05¾	.05¾

CHICAGO (f.o.b. switching district; carload lots in bags, add 3¢ for a.m.p.)

122-124 (a.s.t.m.) wax	.0440	.0450
125-127 (a.s.t.m.) wax	.0465	.0475
127-129 (a.s.t.m.) wax	.0480	.0490
*130-132 (a.s.t.m.) wax	.0520	.0530
*132-134 (a.s.t.m.) wax	.0545	.0555

*For wax shipped in bulk or bag.

Export Prices

GASOLINE

GULF COAST—

U. S. Motor		.05½
60-62 400	.05½	.05½
61-63 390		.05¼
64-66 375	.05¾	.05½

LOS ANGELES—

U. S. Motor grades:		
52-55 octane		.04
55-65 octane	.04	.04¼
65-67 octane	.04½	.04½
67-69 octane	.04½	.04¾
Above 69 octane	.04¾	.05
58-60 400 endpoint	.04½	.05

KEROSENE

GULF COAST—

41-43 prime white		.03⅜
41-43 water white	.03⅜	.04
44 water white		.04¼

LOS ANGELES—

41-43 water white	.04¼	.04¾

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.o.s. in bbls.)—

Cylinder Stocks:		
600 Warren E	.19½	.20
600 S.R. unfiltered		.16½
650 S.R. unfiltered	.17½	.18
600 flash S.R.	.18½	.19
630 flash S.R.	.23	.24
Bright Stocks:		
8 color		.26
6½ plus colors in dilution		.25½

NEUTRAL OIL

200-3 color		.22½
150-3 color		.25

PARAFFIN WAX

NEW YORK (prices per pound)—

123-125 a.m.p.		.035
125-127 a.m.p.		.03625
128-130 a.m.p.		.03875
130-132 a.m.p.		.04125
133-135 a.m.p.		.04625
135-137 a.m.p.		.04875
Crude scale:		
124-126 w.s.	.0220	.0225
124-126 y.s.		.0220

RETAIL OIL MARKETS

Tank wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of November 12, 1935

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Discounts

Under the standard form of commercial consumer contract which went into effect March 1, 1934, save in California, Oregon, Washington, Arizona and Nevada, a discount of 1 cent a gallon off tank wagon or 2 cents a gallon off retail prices is permitted for purchases between 4,000 and 10,000 gallons per month, or 4 cents a gallon off retail prices for purchases in lots of more than 10,000 gallons a month. The minimum delivery is 25 gallons.

Standard Oil Co. (Indiana)

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Chicago	14.0	16.0	4.0	9.8
Decatur, Ill.	15.5	16.5	4.0	9.8
E. St. Louis	15.2	17.2	4.0	9.5
Joliet	15.5	16.0	4.0	9.8
Peoria	15.5	15.5	4.0	9.8
Quincy	15.3	17.3	4.0	8.0
Davenport, Ia.	15.5	(†)	4.0	9.8
Des Moines	15.3	(†)	4.0	9.6
Mason City	15.7	(†)	4.0	10.0
Sioux City	15.5	(†)	4.0	9.8
Duluth, Minn.	16.3	18.3	4.0	10.6
Mankato	15.9	17.9	4.0	10.2
Minneapolis	15.9	17.9	4.0	10.2
LaCrosse, Wis.	16.9	18.9	5.0	10.2
Green Bay	17.2	19.2	5.0	10.5
Milwaukee	15.3	16.8	5.0	10.1
Madison	16.9	18.9	5.0	10.2
Detroit, Mich.	13.5	15.5	4.0	9.3
Grand Rapids	15.6	16.6	4.0	8.0
Saginaw	16.1	18.1	4.0	9.3
Evansville, Ind.	17.2	19.2	5.0	10.3
Indianapolis	17.4	19.4	5.0	10.5
South Bend	17.6	19.6	5.0	12.0
Fargo, N. Dak.	16.9	18.9	4.0	11.2
Huron, S. Dak.	17.4	19.4	5.0	10.7
Sioux Falls	16.9	18 9	5.0	10.2
Kan. City, Mo.*	12.9	14.9	4.0	7.0
Springfield	14.6	16.6	4.0	8.9
St. Louis	15.2	17.2	3.5	9.5
St. Joseph*	14.9	16.9	4.0	9.2
Wichita, Kans.	14.4	16.4	4.0	8.8
Bartlesville, Okl.	16.0	18.0	5.0	8.8

*State tax 2 cents, 1-cent city tax and 1-cent federal tax.

†Standard Oil Co. (Indiana) has leased all service stations in Iowa.

Discounts to dealers: Undivided accounts, 1½ cents on premium and regular and 2½ cents on third grade off service station prices; divided accounts one-half cent less than undivided. Discounts to dealers in metropolitan Chicago one-half cent larger than rest of Standard of Indiana territory, namely 4 cents and 3 cents on respective grades. Where prices are more than 1 cent below normal, the discounts are one-half cent less than above.

Stanolex Furnace Oil in Chicago

Effective June 27, 1935, f.o.b. Chicago tank wagon prices: Range oil, less than 100 gallons, 8.5 cents; 100-149 gallons, 7.5 cents; 150 gallons and more, 7.0 cents. No. 1 (36-40 lt. stw. zero), less than 100 gallons, 8.5 cents; 100-149 gallons, 7.5 cents; 150 gallons or more, 7.0 cents; No. 2 (30-34, stw. zero), same prices and quantities as No. 1; No. 3 (22-26, zero), less than 150 gallons, 7.2 cents; 150 gallons or more, 6.2 cents. No. 4 (12-16 zero), less than 400 gallons, 7.2 cents; 400 gallons or more, 6.2 cents, viscosity of No. 4, 35° and 100° F.; No. 5, less than 400 gallons, 5½ cents; 400 gallons or more 4½ cents.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Denver, Colo.	18.0	20.0	5.0	11.0
Pueblo	18.0	20.0	5.0	13 0
Grand Junction	20.5	22.5	5.0	15.0
Casper, Wyo.	18.5	20.5	5.0	11.5
Cheyenne	18.5	20.5	5 0	13.0
Butte, Mont.	21.0	23.0	5.0	17.5
Billings	19.5	21.5	6.0	16.5
Helena	21.5	23.5	6.0	17.5
Great Falls	20.5	22.5	6.0	17.5
Salt Lake, Utah	18.0	20.0	5.0	16.0
Twin Falls, Ida.	23.0	25.0	6.5	18.0
Boise	22.5	24.5	6.0	18.0
Albu'que, N. M.	20.0	22.0	*6.5	13.0

*One-half cent city tax.

Discount to dealers with or without contract in Continental territory: Undivided dealer discount off service station price, 4 cents; divided dealer accounts, 3½ cents.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Atlanta, Ga.	20.0	22.0	7.0	12.0
Augusta	20.0	22.0	7 0	14.0
Macon	20.0	22.0	7 0	13.0
Savannah	18.0	20.0	7.0	14.0
Birm'ham, Ala.	21.0	23.0	8.0	12.0
Mobile	19.0	21.0	8.0	10.0
Montgomery	22.0	24.0	8 0	15.5
Jackson, Miss.	19.0	21.0	7.0	11.0
Vicksburg	19.0	21.0	7.0	12 0
Jacksonville, Fla	18.5	20.5	8.0	10.0
Miami	18.5	20.5	8.0	13.5
Pensacola	19 0	20.0	8.0	11.5
Tampa	18.5	20.5	8 0	11 0
Lexington, Ky.	19.5	21.5	6.0	10.0
Covington	18.0	20.0	6.0	11.5
Louisville	18 5	20.5	6.0	10.0
Paducah	18.5	20.5	6.0	10.0

In addition to the state tax of 6 cents Montgomery, Ala., has a county tax of 1 cent per gallon and a city tax of 1 cent per gallon on gasoline, and one-half cent per gallon on kerosene. Mobile and Birmingham, Ala., each have a city gasoline tax of 1 cent per gallon. Pensacola, Ala., has a city gasoline tax of 1 cent.

Southwestern District

MAGNOLIA PETROLEUM CO.

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Dallas, Tex.	15.0	17.0	5.0	7.0
Fort Worth	15.0	17.0	5 0	7.0
Houston	16.0	18.0	5.0	8.0
San Antonio	16.0	18.0	5.0	8 0
El Paso	17.0	19.0	5 0	10.0
Muskogee, Okla.	16.0	18.0	5.0	8.0
Okla. City	16.0	18.0	5.0	8.0
Tulsa	16.0	18.0	5.0	8.0
Ft. Smith, Ark.	14.5	18 0	5.0	8.0
Little Rock	17.0	20.5	7.5	9.5
Texarkana	15.5	17.5	5.0	8.0

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Atl'tic City, N. J.	13.5	17.0	4.0	9.0
Newark	13.5	17.0	4.0	7.5
Annapolis, Md.	14.8	18.3	5.0	10.0
Baltimore	14.3	17.8	5.0	7.5
Cumberland	15.8	19.3	5.0	12.7
Wash'g'n, D. C.	12.5	16 0	3.0	9.0
Danville, Va.	16.6	20.1	6.0	12.9
Norfolk	15.1	18.6	6.0	11.3
Petersburg	15.8	19.3	6.0	11.7
Richmond	15.8	19.3	6.0	11.7
Roanoke	16.8	20.3	6.0	12.9
Charles'n, W. Va.	15.0	18.5	5.0	12.6
Parkersburg	14.3	17.8	5.0	11.2
Wheeling	15.5	19.0	5.0	12.2
Charlotte, N. C.	17.9	21.4	7.0	12.9
Hickory	18.2	21.7	7 0	13.1
Mt. Airy	18.2	21.7	7 0	13.2
Raleigh	17.6	21.1	7 0	12.7
Salisbury	18.0	21.5	7.0	13.0
Charleston, S. C.	16.2	19.7	7.0	11.3
Columbia	17.5	21.0	7.0	12.6
Spartanburg	17.9	21.4	7.0	12.9

Tank wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at regular price less one-half cent. Discount for kerosene, 1 cent off tank wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except in New Jersey, where no discount (if necessary) is given.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Omaha	16.9	18.9	5.0	10.1
McCook	17.6	19.6	5.0	10.8
Norfolk	17.3	19.3	5.0	10.5
North Platte	17.7	19.7	5.0	10.9
Scottsbluff	18.4	30.4	5.0	11.6

Note: Discounts to dealers; where service station gasoline prices are (maximum overall, including rent) as follows: Reliance, 2½ cents; Standard Red Crown, 3½ cents; Red Crown Ethyl, 3½ cents.

Where service station gasoline prices are below normal resellers' allowances are reduced one-half of the amount below normal, down to the following (minimum overall, including rent): Reliance, 2 cents, Standard Red Crown, 3 cents; Red Crown Ethyl, 3 cents. Discounts to consumers for tank wagon deliveries covered only by Standard Commercial Consumers Contract, effective January 1, 1935.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Ohio points	17.0	19.0	5.0	*12.5

*Includes state tax of 1 cent.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Philadelphia, Pa.	16 0	18 0	5.0	9.0
Pittsburgh	17.0	19.0	5.0	10.0
Allentown	16.5	18 5	5.0	9 0
Erie	16.0	18.0	5.0	8 0
Scranton	16.5	18 5	5.0	10 0
Altoona	17.0	19.0	5.0	10 0
Dover, Del.	16 5	18 5	5.0	10 0
Wilmington	16.0	18 0	5 0	9.0
Springf'd, Mass.	13 2	16 7	4 0	7 5
Worcester	13.3	15.5	4 0	7.5
Hartford, Conn.	13.3	15.8	3 0	7.0
New Haven	12.3	15.7	3.0	7.5
Providence, R. I.	12.0	13.5	3.0	7.0

Note—Tank wagon prices are those applicable to consumers purchasing lots of 100 or more gallons in one delivery.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
N. Orleans, La.	17.5	21.0	‡8.0	12.0
Baton Rouge	16 5	20.0	†7.0	11.5
Alexandria	17.5	21.0	†‡8.0	10.5
Lafayette	18.0	21 5	‡*8.0	12.5
Lake Charles	18.0	21.5	†‡8.0	†11.0
Shreveport	16 0	19.5	†7.0	9.0
Knoxville, Tenn.	20.5	24.0	8.0	14.0
Memphis	18.5	22.0	8.0	9.5
Chattanooga	20.0	23.5	8.0	11.5
Nashville	19.5	23.0	8.0	10.0
Bristol	18.35	21.1	8.0	14.5

*Includes city tax of 1 cent.

†Includes 1-cent parish tax. ‡Includes 3 cent parish tax.

Tank wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at dealer price less one-half cent.

Louisiana kerosene prices include 1-cent state tax.

New York and New England

SOCONY-VACUUM CO., INC.

	Gasoline			Kero.
	Post deal	Serv. sta.	Inc. tax	tank wag.
Albany, N. Y.	14 2	17 7	5.0	7.5
*Met. New York	15 05	19 3	5 0	7 0
*Br'kl'n, Queens	14.8	18 8	5.0	7.0
Buffalo	12.0	14.0	5.0	8.0
Rochester	14.0	17.0	5.0	8.0
Syracuse	13.5	16.0	5.0	8.5
Boston, Mass.	13.0	16.5	4.0	6 75
Portland, Me.	13.5	16 0	5.0	7.5
Manch'ter, N. H.	14 8	18.3	5.0	7.75
Burlington, Vt.	16.2	19.7	5.0	8 5

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
San Francisco	13 5	15 5	4.0	10 0
Los Angeles	13.0	15 0	4.0	10 5
Fresno, Calif.	14 0	16.0	4.0	9.0
Phoenix, Ariz.	17.5	19 5	6.0	‡16 0
Reno, Nev.	16.5	18.5	5 0	13.0
Portland, Ore.	16.5	18.5	6.0	13.5
Seattle, Wash.	16.5	18.5	6.0	13 5
Tacoma	16.5	18 5	6.0	13.5
Spokane	19.5	21.5	6.0	16.5

*Retail prices posted by Standard Stations, Inc., a subsidiary.

†Prices are at company's plant or depots, as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where discount is 1 cent.

‡Includes 5-cent state tax.

Canada*

Imperial 3-Star Gasoline

IMPERIAL OIL, LTD.

	Gasoline			Kero.
	Tank wag.	Serv. sta.	Inc. tax	tank wag.
Hamilton, Ont.	21.0	23.5	6.0	16.5
Toronto, Ont.	21.0	23.5	6.0	16.5
Brandon, Man.	30.3	33.3	7.0	31.8
Winnipeg, Man.	28.7	31.7	7.0	30.3
Regina, Sask.	30.0	33.0	7.0	31.5
Saskatoon, Sask.	32.8	35.8	7.0	34.3
Edmonton, Alta.	32 2	35.2	7.0	33.7
Calgary, Alta.	29.5	32.5	7.0	31.0
Vancouver, B. C.	24.5	27.5	7.0	24.0
Montreal, Que.	20.5	23.0	6.0	17.0
St. John, N. B.	26.0	30.0	8.0	19.5
Halifax, N. S.	26.0	30.0	8.0	19.5

*Imperial gallon used in Canada.

In maritime provinces all dealers get 4 cents off service station price. In all other provinces open dealers get 3 cents off service station price and 1 cent additional to 100 per cent accounts, except Montreal City, Hamilton and Toronto, where open dealers get 2½ cents off service station price with 1 cent additional to 100 per cent accounts.

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gallon lots if covered by contract.

Retail Price Changes

Standard Oil Co. of Louisiana November 9 advanced tank wagon and station gasoline .5 cent in Knoxville, Memphis, Chattanooga, Nashville and Bristol.

Standard Oil Co. of Kentucky October 19 reduced tank wagon kerosene 1 cent in Tampa; October 22 reduced tank wagon kerosene 1 cent in Savannah; October 30 reduced tank wagon kerosene 1 cent in Covington; November 2 advanced tank wagon and station gasoline 1 cent in Mobile.

Chicago Markets

CHICAGO, Nov. 12.—Despite slight irregularities caused by a few offerings from scattered regions of the Southwest, the tank car gasoline market here has held firm, reinforced by the strengthening feeling as to crude. Not even the persistence of tank wagon and service station price troubles in some of the leading consuming markets has been able to shake the more optimistic sentiment being displayed here.

Gasoline consumption continues to hit a good rate, despite the fact weather is becoming less favorable to motoring. October was a good demand throughout the Middle West and the gallonage reports of the various companies reflect it. A feeling is developing here that strong efforts will be made in the next few weeks to dry up some of the raggedness of the retail price structure, which is costing the trade substantial sums.

Jobbers' shipping instructions continue brisk, despite the fact they are trying to keep their inventories to low levels. The actual rate of spot market buying is not very impressive. Higher prices for Michigan crude cause some observers to feel chances are lessened for under-selling of Mid-Continent refiners by Michigan refiners.

CRUDE OIL PRICES

Oklahoma, Kansas, North Central and East Central Texas

Corsicana (heavy) (June 17, 1933)	.80
East Texas	$1.06
Other fields	(See gravity table)

West Texas

Crane Upton, Crockett, Howard, Glasscock, Mitchell (Sept. 29, 1933).	$ .70
Ector, Winkler and Pecos Counties and Lea County, New Mexico (Sept. 29, 1933)	.75
Pecos County, Yates shallow Pool (Sept. 29, 1933)*	.65
Jones and Fisher Counties*	(See gravity table)

Rocky Mountain States

Ilen, light (Sept. 29, 1933)	$ .96
Ilen, heavy (Sept. 29, 1933)	.90
Florence, Colo. (June 17, 1933)	.90
Fort Collins and Wellington, Colo., (June 17)	(See Salt Creek prices)
Big Muddy (Sept. 29, 1933)	$1.01
Frannie, light (May 1, 1934)	.70
Frannie, heavy (Sept. 29, 1933)	.62
Salt Creek and LaBarge (Sept. 29, 1933)	(See Stanolind Mid-Continent price schedule)
Grass Creek, light (Sept. 29, 1933)	$1.18
Grass Creek, heavy (Sept. 29, 1933)	.62
Elk Basin (Sept. 29, 1933)	1.18
Rock Creek (Sept. 29, 1933)	1.02
Lance Creek (Dec. 16, 1932)	.92
Hudson (June 2, 1931)	.65
Lost Soldier (Sept. 29, 1933)	.88
Hamilton Dome, all grades (Feb. 16, 1935)	.87
Torchlight (Sept. 29, 1933)	1.18
Greybull (Sept. 29, 1933)	1.18
Pondera (Sept. 29, 1933)	1.25
Sunburst (July 19, 1935)	1.20
Cat Creek, Montana	1.07
Hogback (Sept. 29, 1933)	1.11
Lea County, N. Mex. (Sept. 29, 1933)	.75
Maljamar (Sept. 29, 1933)	.70
Artesia-Jackson (Dec. 1, 1933)	.75

Gulf Coast

Grade A and Grade B specification discontinued by leading buyers. (See gravity table)

Hardin (Aug. 8, 1935)	$.93
Tomball (see note)*	1.15
Livingston (Sept. 29, 1933)†	1.00
Cleveland (Jan. 11, 1924)	1.00
Greta (June 29, 1935)	.80
Refugio, light	(See gravity table)
Refugio, heavy (June 29, 1935)‡	.80
Conroe	(See Conroe gravity table)
Markham and High Island	(See Gulf Coast gravity table)
Bosca, La. (Jan. 18, 1935)§	$.90

Anahuac and Dickinson posted by Humble August 26, 1935, price of 94 cents per barrel on 30-30.9 gravity with 2 cents per degree increase with top 40 gravity $1.14.

Note—Tomball, effective September 29, by Humble Oil & Refining Co. and October 2 by Magnolia Petroleum Co., and November 10 by Stanolind Crude Oil Purchasing Co.

*Greta posted by Texas Co. †Shell Petroleum Corp. ‡Refugio heavy by Humble Oil & Refining Co. Cleveland and Hardin posted by Magnolia Petroleum Co. §Bosco posted by Pure Oil Co.

Middle Western States

OHIO OIL CO.

Lima (Feb. 1, 1935)	$1.15
Illinois (Jan. 5, 1934)	1.13
Princeton, Ind. (Jan. 5, 1934)	1.13
Plymouth	Shut in
Midland, Mich. (Nov. 7, 1935)*	1.12
West Branch, Mich. (Nov. 7, 1935)	.96
Oceana, Mich. (Oct. 5, 1933)	.90
Somerset, Ky. (May 20, 1935)	1.13
Western Kentucky (May 22, 1935)	1.13

*Posted by Pure Oil Co. and Simrall Pipe Line Co. Producers Pipe Line Co. pays 5 cents per barrel over Pure Oil Co.'s posted prices. West Branch, Mich., posted by Simrall Pipe Line Co. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and posted prices includes premium. Oceana posted by Old Dutch Refining Co. and Naph-Sol Refining Co.

North Louisiana and Arkansas

Smackover, Ark. (all grades)	$ .70
Tullos, Urania, La. (Jan. 13, 1934)	.87
Nevada, Ark. (Sept. 29, 1933)	.80
East El Dorado (Sept. 29, 1933)	.70
Converse, La. (Mar. 17, 1934)	1.03
Elm Grove, La. (Sept. 29, 1933)	.75
Holly, La. (Nov. 17, 1934)	1.08
Pleasant Hill, La. (Mar. 17, 1934)	1.03
Zwolle, La. (Mar. 17, 1934)	1.03
Champagnolle, Ark. (Mar. 17, 1934)	.81
Lisbon, Ark. (Mar. 17, 1934)	1.03
Stephens, Ark. (Sept. 29, 1933)	.70
Urbana, Ark. (Mar. 17, 1934)	.60
Other fields	(See gravity table)

Eastern States

TIDE WATER PIPE CO.
(Effective Oct. 29, 1935)

Bradford, Pa.	$2.15
Allegany, N. Y.	2.15

SOUTH PENN OIL CO.
(Effective Oct. 29, 1935)

Pennsylvania Grade Oil in National Transit Lines (Bradford Field)	$2.15
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.87
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.82
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.67
Corning Grade Oil in Buckeye Pipe Line Co.'s lines	1.82

PENNZOIL CO.
(Effective Oct. 29, 1935)

Pennsylvania Grade Oil in National Transit Lines:	
Group A (Includes Cochran, Franklin, Hamilton and Doolittle districts.)	$2.12
Group B (Includes Titusville district.)	2.11
Group C (Includes Turkey and Tidioute districts.)	2.10
Group D (Includes Bear Creek and Porkey districts.)	2.09
Group E (Includes Rideneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kennerdell, Emlenton, Tiona, Lacey and Kinzua districts.)	2.06
Price depends on length of pipe line haul to plant at Oil City.	

PURE OIL CO.
(Effective Oct. 29, 1935)

Cabin Creek, W. Va.	$1.82
Bradford Hollow, W. Va.	1.82
Kelly Creek, W. Va.	1.82

South Central and Southwest Texas

Darst Creek	$ .87
Mirando (June 29, 1935)	.75
Luling (Sept. 29, 1933)	.75
Pettus	1.05
Salt Flat	.87
Lytton Springs (Sept. 29, 1933)	.95
Duval County (June 29, 1935)	.75
Saxet (June 29, 1935)	.80
Port Lavaca (July 1, 1935)	.80

Canada

Ontario (Sept. 9, 1933):	
Petrolia*	$2.10
Oil Springs	2.17
Turner Valley (May 21, 1934):†	
Clear naphtha	2.55
Discolored naphtha	2.37
Crude oil, 50 gravity	2.19
Crude oil, 45 to 45.9	2.07
Crude oil, 40 to 44.9	1.90

*Imperial Oil, Ltd. †Imperial Oil, Ltd. and Regal Oil & Refining Co.

Mexico

Panuco*	$.845

*F.o.b. ship, based on September transactions and exclusive of production and export taxes and bar dues.

John L. McMahon, for the past 14 years with the Texas Co. as zone manager in the North Texas and Panhandle districts of Texas, with headquarters in Wichita Falls, has been appointed division manager for the company with his offices in Fort Worth, succeeding L. E. Barrows, for many years division manager at Fort Worth, who will have supervision of the producing departments in the Rocky Mountain, Texas, Kansas, New Mexico, Oklahoma and Arkansas with headquarters at Houston. Mr. McMahon, in addition to the North Texas (Wichita Falls) district and Panhandle fields, will manage the West Texas division and will continue his residence in Wichita Falls.

Crude Prices by Gravities

Gravity—	Oklahoma and Kansas	North Texas, Central Texas and East Central Texas	North Louisiana and Arkansas	Gray County, Texas	Carson, Hutchinson and Moore Counties, Texas	Conroe, Texas	Salt Creek, Wyo.	Gulf Coast, Texas and Louisiana	Gulf Coast, Texas and Louisiana	Cotton Valley, Louisiana
	1	2	3	4	5	6	7	8	9	10
Below 20	....	....	....	....	....	....	....	$.82	$.82	....
20-20.9	....	....	....	....	....	....	....	.84	.84	....
21-21.9	....	....	....	....	....	....	....	.86	.86	....
22-22.9	....	....	....	....	....	....	....	.88	.88	....
23-23.9	....	....	....	....	....	....	....	.90	.90	....
24-24.9	....	....	....	....	....	....	....	.92	.92	....
Below 25	*$.76	....	....	....	....	....	....	....	....	$.70
25-25.9	*.78	....	....	....	....	....	....	.94	.94	.72
26-26.9	*.80	....	....	....	....	....	....	.96	.96	.74
27-27.9	*.92	....	....	....	....	....	....	.98	.98	.76
28-28.9	*.84	....	....	....	....	....	....	1.00	1.00	.78
Below 29	.84	$.79	$.79	....	....	....	$.84	....	....	....
29-29.9	.86	.81	.81	....	....	....	.86	1.02	1.02	.80
30-30.9	.88	.83	.83	....	....	....	.88	1.04	1.04	.82
31-31.9	.90	.85	.85	....	....	....	.90	1.06	1.05	.84
32-32.9	.92	.87	.87	....	....	....	.92	1.08	1.06	.86
33-33.9	.94	.89	.89	....	....	....	.94	1.10	1.07	.88
34-34.9	.96	.91	.91	....	....	....	.96	1.12	1.08	.90
Below 35	....	....	....	$.79	$.69	....	....	....	....	....
35-35.9	.98	.93	.93	.81	.71	$1.09	.98	1.12	1.09	.92
36-36.9	1.00	.95	.95	.83	.73	1.11	1.00	1.12	1.10	.94
37-37.9	1.02	.97	.97	.85	.75	1.13	1.02	1.12	1.11	.96
38-38.9	1.04	.99	.99	.87	.77	1.15	1.04	1.12	1.12	.98
39-39.9	1.06	1.01	1.01	.89	.79	1.17	1.06	1.12	1.13	1.00
40 and over	1.08	1.03	1.03	.91	.81	1.19	1.08	1.12	1.14	1.02

STANDARD OIL CO. OF CALIFORNIA

Effective November 1, 1935, and met by all other purchasers. (Ventura Avenue posted by Associated Oil Co.; Shiells Canyon and South Mountain by The Texas Co. and Rincon by General Petroleum Corp.) All gravities above those posted take highest posted price in the field.

Gravity—	Signal Hill	Seal Beach, Alamitos Heights	Huntington Beach	Inglewood	Playa Del Rey	Olinda-Brea Canon	Athens, Rosecrans Dominguez	Elwood Terrace	Torrance	Richfield	Kettleman Hills	Whittier, La Habra	Montebello	Coyote Hills	Santa Fe Springs	Newhall, McKittrick, Kern River	Mountain View	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Conlinga	Wheeler Ridge	Ventura Avenue	Shiells Canyon, South Mountain	Rincon
14-14.9	$ .75	$ .74	$ .73	$ .74	$ .75	$ .71	....	....	$ .75	$ .71	....	$ .71	$ .72	$ .72	....	$ .65	....	$ .65	$ .65	$ .65	....	....	$ .65	....
15-15.9	.75	.74	.73	.74	.75	.71	....	....	.75	.71	....	.71	.72	.72	....	.65	....	.65	.65	.65	....	....	.65	....
16-16.9	.75	.74	.73	.74	.75	.71	....	....	.75	.71	....	.71	.72	.72	....	.65	....	.65	.65	.65	....	....	.65	....
17-17.9	.75	.74	.73	.74	.75	.71	....	....	.75	.71	....	.71	.72	.72	....	.65	....	.65	.65	.65	....	....	.65	....
18-18.9	.75	.74	.73	.74	.75	.71	....	....	.75	.71	....	.71	.72	.72	....	.65	....	.65	.65	.65	....	....	.65	....
19-19.9	.75	.74	.73	.74	.75	.71	....	....	.75	.71	....	.71	.72	.72	....	.65	$ .65	.65	.65	.65	$ .65	....	.65	....
20-20.9	.75	.74	.73	.74	.75	.71	....	....	.75	.71	....	.71	.72	.72	....	....	.65	.65	.65	.65	.65	....	.66	....
21-21.9	.75	.74	.73	.74	.76	.71	....	....	.75	.71	....	.71	.72	.72	$ .73	....	.65	.66	.67	.65	.65	....	.67	....
22-22.9	.75	.74	.73	.75	.78	.72	....	....	.75	.71	....	.71	.72	.72	.73	....	.65	.67	.68	.66	.65	$ .68	.68	$ .64
23-23.9	.75	.74	.74	.76	.79	.73	$ .75	....	.76	.71	....	.72	.73	.72	.73	....	.65	.69	.70	.67	.65	.68	.69	.64
24-24.9	.77	.74	.75	.77	.81	.74	.75	....	.77	.72	....	.74	.74	.73	.73	....	.65	.71	.71	.69	.65	.70	.70	.66
25-25.9	.78	.75	.76	.78	.82	.75	.76	....	.78	.73	....	....	.75	.74	.73	....	.66	.72	.72	.70	.66	.71	.71	.67
26-26.9	.79	.76	.78	.79	.83	.76	.77	....	.79	.74	....	....	.76	.75	.73	....	.67	.74	.74	....	....	.72	.72	.68
27-27.9	.80	.78	.79	.80	....	.77	.79	....	....	.75	....	....	....	.77	.74	....	.68	.76	.76	....	....	.73	.73	.69
28-28.9	.81	.79	.80	.81	....	.79	.80	....	....	.76	....	....	....	.78	.75	....	.70	.77	.77	....	....	.74	.74	.70
29-29.9	.82	.81	.81	.82	....	....	.82	....	....	.78	....	....	....	.79	.77	....	.71	.79	.78	....	....	.75	.75	.71
30-30.9	.83	.83	.82	.83	....	....	.83	....	....	....	....	....	....	.80	.78	....	.72	.81	.80	....	....	.76	.76	.72
31-31.9	....	....	....	.84	....	....	.84	....	....	....	....	....	....	.81	.79	....	.74	.83	....	....	....	....	.77	....
32-32.9	....	....	....	.85	....	....	.86	....	....	....	....	....	....	.82	.81	....	.75	.84	....	....	....	....	.78	....
33-33.9	....	....	....	....	....	....	....	$ .84	....	....	$ .81	....	....	.82	.82	....	.76	.86	....	....	....	....	.79	....
34-34.9	....	....	....	....	....	....	....	.85	....	....	.83	....	....	.85	.83	....	.77	....	....	....	....	....	.80	....
35-35.9	....	....	....	....	....	....	....	.86	....	....	.84	....	....	....	.85	....	....	....	....	....	....	....	.82	....
36-36.9	....	....	....	....	....	....	....	.88	....	....	.86	....	....	....	.86	....	....	....	....	....	....	....	.83	....
37-37.9	....	....	....	....	....	....	....	.89	....	....	.87	....	....	....	.87	....	....	....	....	....	....	....	.84	....
38-38.9	....	....	....	....	....	....	....	....	....	....	.88	....	....	....	.89	....	....	....	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	....	.90	....	....	....	....	....	....	....	....	....	....	....	....	....

Playa Del Rey prices f.o.b. their pipe line. Elwood Terrace prices f.o.b. ship. All purchasing companies met the above prices.

Market Record of Active Oil Stocks Listed on New York Stock Exchange

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1935 High	1935 Low	Week ended Nov. 9 Sales	Week ended Nov. 9 High	Week ended Nov. 9 Low	Week ended Nov. 9 Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends Paid in 1934	1934 High	1934 Low	1933 High	1933 Low
77¾	48½	6,500	77¾	75	75½	Amerada Corp.	788,675	N.P.	50cQ	10-31-35	$2.00	55⅝	39	47⅝	18½
28	20½	24,600	24¾	23⅛	23¾	Atlantic Refining	2,664,904	$25	25cQ	12-16-35	1.00	35¼	21½	32½	12⅝
10⅝	5⅞	84,800	12	10½	11⅝	Barnsdall Corp. A	2,195,397	$5	....	5-11-31	....	10	5⅞	11	3
15⅜	3⅝	183,600	15½	13⅛	14⅞	Columbia Gas & Elec.	11,610,036	N.P.	20c	11-15-35	‡ .25	19¼	6⅝	28⅛	9
10½	6½	78,000	9⅞	9¼	9½	Consolidated Oil Corp.	13,996,072	N.P.	14c	10-31-34	.42	14¼	7¼	15⅜	5
25¾	15⅛	65,500	25¾	24¼	25¼	Continental Oil of Delaware	4,682,722	$5	25c	10-31-35	.50	22¾	15¾	19⅝	4⅞
20⅜	11¾	19,100	20¾	18¾	19⅝	General Asphalt	387,149	$10	25c	12-17-35	....	23½	12	27	4⅝
4⅜	1½	10,600	4¼	4	4	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	5⅝	2½	7⅜	1⅞
1⅞	⅜	1,400	⅞	⅞	⅞	Louisiana Oil Refining	1,302,158	N.P.	....	.....	....	3⅜	⅝	4	⅝
16¾	9½	69,300	16⅞	14	15	Mid-Continent Petroleum	1,857,912	$10	25c	12-2-35	.50	14⅜	9⅛	16	3¾
20⅞	9	3,100	19	17	17	National Supply of Delaware	382,591	$25	....	5-15-31	....	21⅛	10	28⅝	4
14⅛	9¼	23,000	12	11¼	11½	Ohio Oil Co.	6,563,377	N.P.	15cSA	12-14-35	.45	15⅞	8½	17⅝	4¾
11⅜	6¾	3,400	10¾	9½	9½	Pacific Western Oil	1,000,000	N.P.	40c	11-30-34	.40	9⅜	5½	9½	3
1⅜	½	6,400	1½	1	1¼	Panhandle P. & R.	198,770	N.P.	....	.....	....	2½	⅝	4¼	⅜
37⅝	13¾	65,000	37⅝	35½	35¾	Phillips Petroleum	4,154,687	N.P.	25c†	11-30-35	1.00	20¾	13⅜	18¾	4¾
11⅝	6½	21,300	12¼	11	11½	Plymouth Oil Co.	1,050,000	$5	25c	3-30-35	75c & 4% Stk.	16¾	7¼	17⅝	6¾
12⅛	5⅞	60,900	12¼	11¾	12	Pure Oil Co.	3,038,370	N.P.	....	9-1-30	....	14⅞	6⅛	15⅜	2½
46¼	29½	1,100	46½	45¾	45¾	Royal Dutch N. Y. shares	fl. 503,642,000	fl. 100	$1.70	8-1-35	1.35	39½	28⅝	39¾	17⅝
35⅞	20¾	12,900	33⅜	31	31½	Seaboard Oil of Delaware	1,244,283	N.P.	15cQ†	12-14-35	1.00	38⅜	20¾	43⅜	15
13	5½	24,700	13	11¾	12	Shell Union Oil	13,070,625	N.P.	....	6-30-30	....	11½	6	11⅝	4
107¾	63⅛	4,300	107¾	104½	106	Shell Union Oil pfd.	400,000	$100	....	7-1-31	....	89	57	61	28½
18¾	4¾	6,100	5½	4⅞	5	Simms Petroleum	461,698	$10	1.25 liq.	10-18-35	.55	17⅛	7¼	12⅜	4⅞
17	6½	8,700	17	14	15	Skelly Oil	1,008,514	$25	....	12-15-30	....	11½	6	9⅞	3
15¾	10⅝	83,500	12½	12	12⅛	Socony-Vacuum	31,154,379	$25	15cQ	9-16-35	.60	19⅞	12½	17	6
38⅞	27¾	22,300	38¾	37⅜	37⅜	Standard Oil of California	13,102,900	N.P.	25c	12-15-35	1.00	42⅞	26½	45	19½
28⅜	23	22,300	28⅜	28	28⅛	Standard Oil (Indiana)	15,215,677	$25	25cQ	12-16-35	1.00	32¾	23¼	34	17
32	20	100	23	23	23	Standard Oil of Kansas	200,000	$10	50cQ	10-31-34	2.00	41	26	39⅞	12¾
50½	35¾	31,400	49½	48⅝	49⅜	Standard Oil of New Jersey	25,856,081	$25	50cSA†‖	12-16-35	1.25	50⅛	39¼	47½	22¾
75½	60½	3,700	74	72½	73	Sun Oil	1,733,013	N.P.	25c¶	12-16-35	$1 & 9% Stk.	74¼	51½	59	35
23¾	16½	41,800	23⅜	22⅝	23	Texas Corp.	9,486,417	$25	25cQ	10-1-35	1.00	29⅜	19⅝	30⅛	10¾
9¼	3¼	15,600	9	8½	8½	Texas Pacific Coal & Oil	880,703	$10	....	12-31-29	....	6½	2½	6½	1⅜
12	7⅝	37,600	12	10⅞	11⅜	Tide Water Associated	5,632,136	N.P.	....	2-16-31	....	14⅜	8	11¾	3⅛
103⅝	84	1,300	101¾	101	101¾	Tide Water Associated pfd.	626,222	$100	$1.50Q	10-1-35	$8.50	87	64½	65¼	23½
20¾	14¾	10,400	20¾	20¼	20½	Union Oil of California	4,386,070	$25	25cQ	11-9-35	1.00	20½	11½	23⅜	8½
26½	20⅞	2,900	23⅞	22½	23½	Union Tank Car Co.	1,200,000	N.P.	30cQ	12-2-35	1.20	25¾	15⅝	22¾	10½
2⅝	1	1,000	2⅛	2	2	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	5¾	2	5½	2

*Ex-dividend. †Plus extras. ‡Payable in preferred stock. §On account of accumulation. ‖Dividend 4/75 Mission Corp. paid 3-15-35. ¶and 7 per cent stock.

Market Record of Active Oil Stocks Listed on New York Curb

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1935 High	1935 Low	Week ended Nov. 9 Sales	Week ended Nov. 9 High	Week ended Nov. 9 Low	Week ended Nov. 9 Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends Paid in 1934	1934 High	1934 Low	1933 High	1933 Low
42	30½	400	41	40	41	Buckeye Pipe Line Co.	200,000	$50	75cQ	12-14-35	$3.00	38	26	29¾	25
4¼	1⅝	35,200	3⅞	2⅝	2¾	Caribb Syndicate	799,020	25c	....	.....	....	5½	1½	7¾	¼
157	115	100	125	125	125	Chesebrough Mfg. Co.	120,000	$25	$1Q†	9-27-35	11.50	150	116	129	71
2⅞	¾	318,200	3¼	2½	3	Cities Service	37,804,394	N.P.	....	6-1-32	....	4¼	1¼	6¼	1½
2¼	½	2,800	1	⅞	1/16	Colon Oil	2,200,000	N.P.	....	.....	....	3¼	½	4	¼
⅞	¼	500	⅜	⅜	⅜	Cosden Oil	399,687	$1	....	.....	....	3⅞	½	3⅞	1¾
23½	10	27,900	22½	21⅞	22½	Creole Petroleum	6,974,356	$5	....	.....	....	14⅜	9⅝	12	4¾
6¾	4	1,000	6¾	5¾	6¾	Darby Petroleum	509,696	$5	25c	7-15-35	.50	7½	4⅛	8	2⅛
2	¾	200	1⅜	1⅜	1⅜	Derby Oil & Refining	263,162	N.P.	....	.....	....	2¼	1	2¾	⅞
38	34	100	36	36	36	Eureka Pipe Line	50,000	$50	$1Q	8-1-35	4.00	37	30	41¾	20
74¾	50¼	9,900	69⅝	68	68	Gulf Oil Corp.	4,538,101	$25	....	10-1-31	....	76¾	49¾	62	24
64	44	4,300	62¼	60⅛	61¼	Humble Oil & Refining (new)	8,923,935	N.P.	25cQ	10-1-35	$1.25	49½	33¼	105½	40
22½	15⅜	13,200	22⅛	21⅛	21⅞	Imperial Oil of Canada	26,919,871	N.P.	25cSA†‡	6-1-35	.92½	17⅞	12⅝	15⅞	6½
6	3⅝	800	5¼	4⅞	5¼	Indiana Pipe Line	300,000	$10	15cSA†	11-15-35	.35	6⅞	3⅝	8	3⅛
39¾	28	30,300	39⅜	37⅝	38	International Petroleum	14,247,088	N.P.	75cSA†‡	6-1-35	2.28	33⅜	19⅜	23½	8⅞
9½	4⅜	12,000	9	8⅞	9	Louisiana Land & Exp.	3,000,000	N.P.	....	.....	....	5	2⅛	2¼	3/16
6¾	3½	1,600	6¾	4⅞	5½	Lion Oil Refining	270,000	N.P.	....	10-27-30	....	6	3⅜	9½	1¼
10⅞	4½	7,900	10⅞	10¼	10½	Lone Star Gas	5,382,723	N.P.	15cSA	8-15-35	‖ .16	8⅜	4¼	11⅞	4¾
5½	4⅛	1,600	5	5	5	Mountain Producers	1,682,182	$10	15cQ	10-1-35	.60	5½	4	6½	2½
20	11¾	8,200	20	18½	19⅛	National Fuel Gas	3,810,183	N.P.	25cQ	10-15-35	1.00	18⅛	13⅛	20	10
10½	6¾	1,300	9½	9¼	9¼	National Transit	509,000	$12.50	40cSA	6-15-35	.75	9½	7	10	5½
3¼	2	100	2½	2½	2½	New Bradford Oil	1,445,202	$5	10cSA	9-16-35	.20	2½	1¾	2⅛	½
2⅛	1	200	1¾	1¾	1¾	New Mexico and Arizona	1,000,000	$1	....	.....	....	2¾	1	1⅞	½
4⅞	3	100	4½	4½	4½	New York Transit	100,000	$5	15cSA	4-15-35	.30	4¾	3	4⅞	3
8	5¼	800	8	7½	8	Northern Pipe Line	120,000	$10	25cSA	2-2-36	.50	7	4⅝	6⅛	4¼
3½	1¼	16,400	3⅜	3⅛	3⅜	Pantapec Oil	1,608,700	N.P.	....	.....	....	2⅝	⅞	3¾	½
1½	⅝	100	1⅛	1⅛	1⅛	Ryan Consolidated	296,931	N.P.	....	.....	....	3⅜	⅞	4¼	⅝
7½	5½	1,300	7	6¾	6¾	Salt Creek Producers	1,496,859	$10	20cQ	11-1-35	.80	7⅞	5½	9¼	3½
20	21⅝	1,000	27¾	27	27	South Penn Oil	1,200,000	$25	30cQ	9-30-35	1.20	26½	17½	22⅛	11
5	3⅞	100	4½	4½	4½	Southern Pipe Line	100,000	$10	15cSA	9-3-35	.25	5½	3½	6	2⅛
52½	45¼	150	47¾	45½	45½	Southwest Penna. Pipe Lines	35,000	$50	$1Q	10-1-35	5.00	47	41	43	24½
..	18	4,200	22	21⅛	22	Standard Oil of Kentucky	2,604,790	$10	25cQ†	9-14-35	1.50	18⅜	14⅝	19¼	8⅜
12	7¾	600	12	11½	11½	Standard Oil of Nebraska	188,403	$25	....	6-20-34	.50	16⅞	8¼	20½	11
20¼	11½	8,700	23⅜	20¼	20¼	Standard Oil of Ohio	753,740	$25	....	1-3-33	....	28½	12¼	41	15½
2⅞	⅞	12,100	2¾	2⅜	2½	Sunray Oil	1,610,810	$1	....	4-15-31	....	2	1/16	1½	¼
6⅞	5	2,400	6½	6⅛	6⅛	Texon Oil & Land	336,028	N.P.	15cQ	9-30-35	.90	11	4⅜	13¾	6¼

*Ex-dividend. †Plus extras. ‡Payable in Canadian funds. §Includes 50 cents on old $25 par value stock. ‖Payable in preferred stock.

Note.—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

NEW OR IMPROVED EQUIPMENT

New Berry Pattern Casinghead Is Introduced by Jarecki

The new Jarecki improved Berry pattern casinghead placed on the market by the Jarecki Manufacturing Co. is of the high-pressure type and

suitable for any working pressure for which this style head may be used. Heavily constructed of semisteel, the Jarecki casinghead features set-screws inclined at such an angle from the horizontal as to be perpendicular to the beveled edge of the top or tubing support, thus eliminating the tendency of the set-screws to bend and break off.

The casingthread conforms to A.P.I. standards, and is designed exactly like an A.P.I. casing collar. The thread is full length and is recessed. The side outlets have full-length threads. The head is available in all casing sizes, and for any size tubing.

The interior of the head is circular, and there are no shoulders to catch tubing collars. The upper interior edge is beveled to prevent catching collars when rerunning tubing. The exterior is circular, the edges of the side-outlet bosses serving as convenient gripping points for chain tongs when screwing onto casing. The set-screw flange of the head is provided with tapered drain holes to drain oil or water out of the space around the top or tubing support.

Here and There With Men Who Manufacture Equipment

Oil Center Tool Co., Houston, Tex., has transferred Holmes Smith, for the last year inspector in the shop, to its sales staff, assigning him to the South Texas territory.

F. H. (Leo) Oliphant has been national sales representative by the Pittsburgh Equitable Meter Co. and its subsidiary, Merco Nordstrom Valve Co. His headquarters will be in the company's main offices in Pittsburgh, Pa.

R. S. Schermerhorn has been made Mid-Continent representative for E. M. Smith Co., Los Angeles, manufacturer of the Grizzly line of oil-field products.

McCord Radiator & Manufacturing Co. has opened an office in Tulsa, out of which it will handle sales in the Mid-Continent territory. The office, at 310 Thompson Building, is in charge of John S. Lyall.

Griscom-Russell Co., manufacturer of heat exchange equipment, has appointed A. W. Burket district manager, with headquarters at 20 North Wacker Drive, Chicago, from which point he will supervise direct sales and agency activities in the Chicago, St. Louis, Detroit, Milwaukee and adjacent territories.

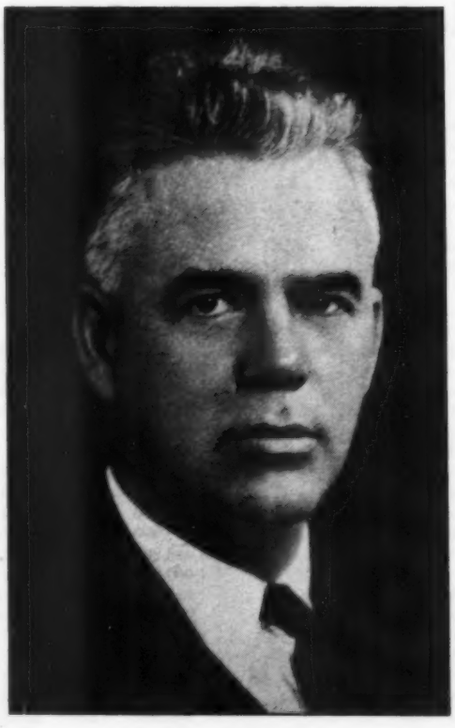
About 100 field service representatives of Oakite Products, Inc. will meet at their headquarters office in New York, December 9 to 13, 1935, in the annual technical sales conference. Papers read will deal with cleaning problems.

Application and handling of nickel and other alloy steels in four important fields were outlined in a talk by H. J. French of the International Nickel Co., at a meeting of the Schenectady, N. Y., chapter, American Society for Metals.

Men Widely Known in the Equipment Field

Paul Weeks, for the past four years manager of Caterpillar Tractor Co.'s Washington, D. C., office, has succeeded Walter H. Gardner as manager of the special sales division, the latter having left the company to become general sales manager of Keystone Steel & Wire Co. Assisting Mr. Weeks will be C. L. McMullen, in charge of engine sales to manufacturers, and G. E. Spain, in charge of power unit sales to distributors and engine dealers.

Mr. Weeks, a graduate of the University of Nebraska and Massachusetts Institute of Tech-



PAUL WEEKS

nology, first joined the "Caterpillar" organization in 1910 as consulting engineer. Since then he has served successively as chief engineer, general service manager and Washington manager. The special sales division, of which he is the new head, was organized four years ago to merchandise the company's Diesel and gasoline engines and special tractor assemblies.

Enardo Valve and Thief-Hatch Incorporate New Features

A valve and thief-hatch which need no iron collar, avoid waste of oil and drippings on the roof, and eliminate fire hazards from sparks have been designed for water-seal wood tanks by the Enardo Manufacturing Co. of Tulsa. The device is an all-

aluminum vacuum-pressure type made in both round and long models. A tall 10-inch base was developed in order that it might not be necessary to build an iron base. The double-width opening on the long type permits a rest for the thief inside the opening, avoiding waste of oil and drippings on the roof.

The vacuum and pressure are controlled by weight of the metal. The valve has no springs, is nonmagnetic, will not produce a spark when struck by metal, and is rust-resistant. It is equipped with a felt-backed, gasoline and oil-proof cork fiber gasket. The gasket is in the lid and so arranged that ice and dirt will not gather on the fiber, thus holding the valve open or freezing it shut.

The thief-hatch opening on the round model is 2 inches in diameter and the long model is 7¾"x17½". The vacuum valve inside the lid is 5½ inches in diameter and is sufficiently large to take care of normal breathing on tanks for which it was designed. Valves are furnished for a one-half ounce vacuum and a pressure of 2 ounces or any other specifications needed.

Acetylene Cylinder Manifold

A new wall type acetylene cylinder manifold, the Oxweld type M-8, has been announced by the Linde Air Products Co., 30 East Forty-second Street, New York. It is available in a 10-cylinder unit to which extensions in units of 5 or 10 cylinders can be made. The new manifold consists of two high-pressure header units. These feed into a central regulation system which delivers acetylene to the distribution piping system at pressures up to 15 pounds per square inch.

Starting Unit for Diesel and Gas Engines Is Announced

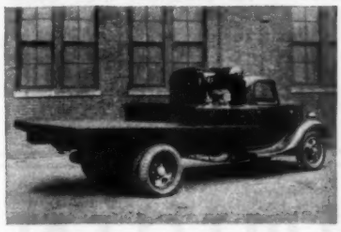
A fast-working single-stage air-compressor for starting gas and Diesel engines, capable of filling a tank of 6 cubic feet capacity up to 200 pounds pressure in 5 minutes or up to 250 pounds in 9½ minutes, is offered by the Cooper-Bessemer Corp. The new unit, the GX3A, runs equally well on either gas or gasoline. It is a simple, self-contained combination engine and compressor. Ford parts are largely used, pistons, piston rings, connecting rods, connecting-rod bearings, and many smaller parts being thus obtained.

Both power and compressor cylinders, cast in one piece, are water-jacketed. The power-cylinder head, which is a separate casting, is of the au-

tomotive type, water-cooled, and carries a spark-plug only. A Ford model B gasoline carburetor and an adjustable gas mixing valve are furnished as standard equipment, also a rotary-type magneto with impulse coupling for hand starting. Where gas is the fuel, it is possible to start the engine on gas; but the recommended procedure is to start on gasoline, then switch to gas.

Smaller Size Air Compressors Announced by Worthington

Smaller sizes of the Worthington Aero two-stage portable compressors, mounted on standard trucks and suitable for pipe line work, jobs requiring pneumatic tools, etc., are announced by Worthington Pump & Machinery Corp., Harrison, N. J. These compressors are made in sizes giving actually 85 to 500 cubic feet of free air de-



livery a minute, with pressures ranging from 100 to 500 pounds. The inconvenience of towing a second vehicle is eliminated.

The illustration shows a typical application. Space is left on the standard truck floor for other loads after the compressor is installed, making the compressor particularly desirable for numerous small jobs encountered in the oil fields. In many instances the truck and one trip take care of everything.

The compressor is driven through a power take-off on the truck shaft, through a Worthington Multi-V-Drive, by the truck engine. It is rigidly mounted on the truck frame and belt tension is maintained by a ball-bearing idler. The compressor is a three-cylinder air-cooled unit with air-cooled intercooler. It has Timken tapered roller main bearings, force-feed filtered lubrication throughout, and is equipped with Worthington patented feather valves. Mountings can be accommodated to any standard truck chassis and any standard or special body type.

Bulletins, Booklets and Other Literature for the Trade

The Bovaird straight-lift pumping-jack is described and illustrated in a 12-page bulletin obtainable from the Bovaird Supply Co., Tulsa.

Allis-Chalmers Bulletin 1,153-A is a new publication on its engine type alternators for use with any kind of reciprocating prime mover. They are available for standard engine speeds from 100 r.p.m. to 600 r.p.m. in standard ratings from 25 kva to 10,000 kva.

The first issue of the Drummer, published by the Steel Barrel Manufacturers Council, Keith Building, Cleveland, Ohio, contains matter which indicates its regular arrival will be welcomed in oil company offices.

A six-page bulletin discussing Amsco hard-surfacing welding rods is offered by American Manganese Steel Co., Chicago Heights, Ill.

Frick-Reid Supply Co. has opened a new store in the Rodessa, La., Field, with F. S. Stagg as manager. This new store is in the Shreveport, La., district of the company. H. C. White is district manager.

Two new bulletins have been prepared by Consolidated Ashcroft Hancock Co., Bridgeport, Conn. One describes the new Hancock Flocontrol valve, manually operated with a straight-line flow characteristic. The other gives details on the new Hancock union bonnet bronze valve, with stainless-steel trim to resist steam cutting and wire drawing.

New EC&M line-arc contactors are described in a bulletin offered by the Electric Controller & Manufacturing Co., Cleveland, Ohio.

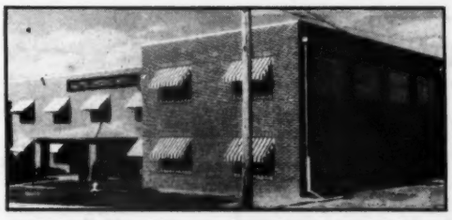
Synthane Corp., Oaks, Pa., has issued a folder, "Synthane Laminated Bakelite for Mechanical Applications," containing the essential physical, electrical, chemical and mechanical properties of Synthane, some of the more important material strength values, representative uses, machinability, types of stock, shapes and colors.

The Manhattan Rubber Manufacturing Division, Passaic, N. J., has issued a new bulletin, No. 6808-B, explaining details of the Condor compensated belt.

"Some Notes on Bethlehem's Alloy Steels," a 16-page booklet, published by the Bethlehem Steel Co., Bethlehem, Pa., contains a physical-property chart for each of the seven types or groups of alloy steels described. The technical information included is readily understandable by the user concerned with the difficult problems of application.

A 24-page bulletin, "Weld It Well," published by Harnischfeger Corp., Milwaukee, Wis., covers the complete line of P&H-Hansen arc welders from 50 to 800-ampere units as well as welding fixtures and accessories.

Bulletins offered by Lincoln Electric Co., Cleveland, Ohio, cover two engine-driven welders, model SA-300, type S-3677, and model SA-200, type S-3676.



Office and machine shop of the Allsteel Products Manufacturing Co., Wichita, Kans.

Seats Insert Pump at Desired Points Within the Tubing

Bradford Motor Works, Inc., Bradford, Pa., announces a perfected combination packer and hold-down for seating the Admore and other insert pumps at any desired point within the tubing, thus making it possible to pump from any level without the necessity of pulling or moving the tubing. No common working barrel or seating device is needed.

The Admore insert pump anchor replaces the conventional hold-down arrangement on the Admore pump. It is sturdily constructed and simple, consisting of a tube on which are mounted a specially designed slip assembly and expander sleeve, and onto which is screwed the bottom collar and tapered head with rubber packer. The slip assembly arrangement is such that the possibility of accidental setting, while running into the hole, is eliminated, yet it is possible to set easily when the desired level is reached. When the slips are set the downward travel of the expander sleeve is stopped, and the weight of the rods, when set down on the anchor, causing the tapered head to sink into and expand the rubber packer.

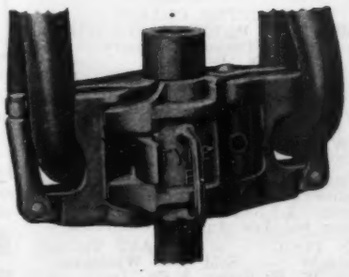
Allegheny Architectural Tubing

Allegheny Steel Co., Brackenridge, Pa., has announced a new stainless steel tube designated as Allegheny metal architectural tubing. This new product is thin-wall stainless tubing without or with carbon-steel inserts fabricated into the tube when applications demand additional strength and rigidity. The company is now prepared to make the following O.D. sizes: Five-eighths inch, three-quarters inch, seven-eighths inch, 1-inch, 1¼-inch, 1½-inch, and 1.9-inch. Certain sizes of square and rectangular shapes will also be produced.

Mine Safety Appliances Co., Pittsburgh, Pa., has completed a bulletin on the M.S.A. carbon monoxide indicator, a portable instrument designed to indicate the low concentrations of carbon monoxide in air recognized as dangerous.

Elevators for External-Upset Drill Pipe

Two new designs in elevators to handle external-upset drill pipe rapidly and safely without the use of lifting plugs have been developed by Byron Jackson Co., 2150 Slauson Avenue, Los Angeles, Calif. These elevators are designed to support and lift the pipe by the upset and to withstand all wedging strains imposed upon an elevator by external upset pipe. One style is the BJ Type B, for side-door operation. The other is the BJ Type G, for operators who prefer a center-latch elevator.



The opening in the Type B elevator is amply wide to receive the drill pipe below the upset. When the load is taken, the upset fits into a recessed and tapered upper portion of the body and cannot then come out until the load is released and the elevator dropped below the upset. Automatic safety is provided by the door. Even though the door may not be entirely closed by the derrickman, positive closing is insured.

The Type G elevator is made in two halves split in the center with the latch opposite the hinge. The wedging action of the upset is taken care of by a heavy stirrup-type latch which fits over two strong lugs, one on each half of the body. This eliminates strain on the latch pin, which merely has to serve as a hinge for the latch and hold it in position after the elevator is closed. The stirrup-type latch makes the elevator safe against accidental opening.

Important Vacancy Decision Involving Pecos County Land

In a directed decision by the District Court of Pecos County, Texas, the Stanolind Oil Co. and about 100 other defendants were sustained in their claim of boundary rights in a suit filed by the State of Texas to establish a vacancy in a strip of land about 215 varas (595.55 feet) between the south boundary of Surveys 101, 102, 103 and 104 in Block 94, T.C. Ry. Co. Survey and the north Boundary of Block 34½ of the same survey in Pecos County.

On the maps of this region these two boundary lines met but the State claimed a vacancy established by a new survey of the district and tried to secure title to this strip of land to re-lease same. These apparent discrepancies in mapping the West Texas lands have been developed from time to time, and the verdict in favor of the defendants in this particular case is considered of great importance to the oil companies operating in the West Texas region.

Not only was the Stanolind Oil Co. involved in this suit, but also land owners, royalty owners and others who had any interest in this property.

The court directed a verdict against the State in this suit and ordered judgment entered that plaintiff "take nothing." No appeal has been filed.

A.S.T.M. Organizes Committee on Gaseous Fuel Research

The American Society for Testing Materials has been considering requests that it organize a standing committee to undertake certain standardization and research work in the field of gaseous fuels, and a committee has been organized with the following personnel:

American Society of Mechanical Engineers (Power Test Codes Committee on Fuels): E. X. Schmidt, Cutler-Hammer, Inc.; C. E. Bales, Ironton Fire Brick Co.; E. F. Kenney, Bethlehem Steel Co.; J. F. Anthes, Brooklyn Union Gas Co.; G. G. Brown, University of Michigan; R. M. Conner, American Gas Association, Testing Laboratory; W. W. Oakley, Corning Glass Works; Earle Derby, Standard Gasoline Co.; R. L. Dodge, duPont Ammonia Corp.; H. D. Hancock, H. L. Doherty & Co.; A. C. Fieldner, U. S. Bureau of Mines; J. V. Freeman, U. S. Steel Corp.; W. H. Fulweiler, United Gas Improvement Co.; A. W. Gauger, Mineral Industries Research, Pennsylvania State College; S. H. Graf, Oregon State Agricultural College; R. B. Harper, Peoples Gas Light & Coke Co.; G. G. Oberfell, Phillips Petroleum Co.; D. A. Russell, Youngstown Sheet & Tube Co.; H. S. Smith, Carbide & Carbon Chemicals Corp.; S. S. Tomkins, Consolidated Gas Co. of New York; Carl D. Ulmer, Koppers Construction Co.; E. R. Weaver, National Bureau of Standards; J. C. Witt, Universal Atlas Cement Co. Advisory member: T. R. Weymouth, Columbia Gas & Electrical Corp.

A. C. Fieldner was elected permanent chairman; R. M. Conner, secretary, and R. B. Harper, vice chairman. The advisory committee will consist of these officers and Dr. G. G. Brown, J. V. Freeman and G. G. Oberfell. The personnel is being enlarged to provide for representation of other groups and industries.

The main subjects selected for immediate development by the committee are: Collection of samples, measurement of samples, calorific value, specific gravity or density.

Subcommittees are being developed to institute work on these projects. These groups will be appointed in the near future.

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NEW MEXICO Oil and Gas Leases and royalties. Send 50 cents in stamps for new State Oil Map of New Mexico. Roy G. Barton, Clovis, New Mexico.

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